



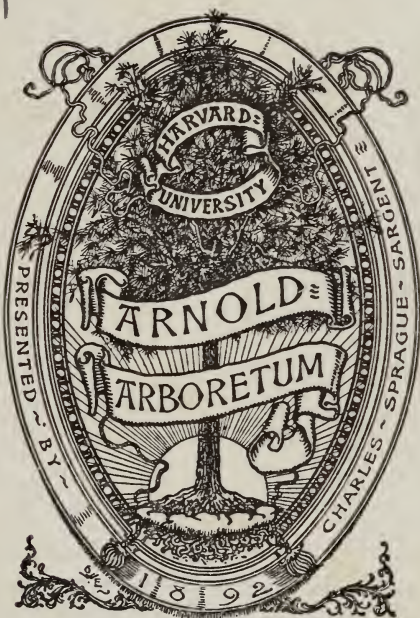


3 2044 105 172 647

A.I.

H-11

GRAY HERBARIUM



DEPOSITED AT THE
HARVARD FOREST
1941

H.I.
H 11

GRAY HERBARIUM

The
Hawaiian Forester
AND
Agriculturist

ISSUED UNDER THE DIRECTION OF THE
Board of Commissioners of Agriculture and Forestry
TERRITORY OF HAWAII

VOLUME 7—NUMBERS 1 TO 12 INCLUSIVELY

EDITOR
DANIEL LOGAN

1910

HONOLULU, HAWAII
THE HAWAIIAN GAZETTE CO., LTD.
1911

Repl. C from ATP 11/26/07

OFFICERS AND STAFF OF THE BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY.

COMMISSIONERS.

Marston Campbell, *President and Executive Officer.*
J. M. Dowsett P. R. Isenberg
H. M. von Holt Albert Waterhouse

DIVISION OF FORESTRY.

Ralph S. Hosmer, *Superintendent of Forestry and Chief Fire Warden.*
David Haughs, *Forest Nurseryman.*
Joseph F. Rock, *Botanical Assistant.*
Bro. Matthias Newell, *in charge of Sub-Nursery at Hilo, Hawaii.*
Walter D. McBryde, *in charge of Sub-Nursery at Homestead, Kauai.*
David Kapihe, *Forest Ranger for Tantalus.*

DIVISION OF ENTOMOLOGY.

Edward M. Ehrhorn, *Superintendent of Entomology and Chief Inspector.*
 Albert Koebele, *Consulting Entomologist.*
 *Assistant Entomologist.*
 D. B. Kuhns, *Inspector.*
 Fred Muir, *Beneficial-Insect Collector.*
 Bro. M. Newell, *Fruit and Plant Inspector, Hilo, Hawaii.*

Robert R. Elgin, }		{ <i>Mahukona, Hawaii.</i>
W. O. Aiken, }	<i>Honorary Fruit</i>	{ <i>Kahului, Maui.</i>
W. D. McBryde, }	<i>and Plant Inspector</i>	{ <i>Koloa, Kauai.</i>
Dr. W. B. Deas, }	<i>at</i>	{ <i>Hana, Maui.</i>
Capt. C. F. Turne }		{ <i>Kaanapali, Maui.</i>

DIVISION OF ANIMAL INDUSTRY.

Victor A. Nørgaard, *Superintendent of Animal Industry and Territorial Veterinarian.*
L. N. Case, *Assistant Territorial Veterinarian.*
..... *Live Stock Inspector,*
H. B. Elliot, *Deputy Territorial Veterinarian for Hilo, Hawaiï.*
J. C. Fitzgerald, *Deputy Territorial Veterinarian for Maui.*
A. R. Glaisyer, *Deputy Territorial Veterinarian for Kawai.*
E. L. Glaisyer, *Deputy Territorial Veterinary for Kohala and Hamakua, Hawaii.*

CLERICAL STAFF

Mrs. E. K. Brown, *Secretary to the Board*,
Miss Melika Peterson, *Clerk and Stenographer*.
Miss Ella K. Dayton, *Librarian*.
Daniel Logan, *Editor of the "Forester."*

CONTENTS

	PAGE
Animal Industry, Division of (reports).....	22, 73, 112, 304, 322
Australian Experiment Farm, An.....	313
Board of Commissioners of Agriculture and Forestry (meet- ings) ...	17, 47, 70, 106, 131, 199, 225, 292, 296, 319, 334, 361
Botany and Horticulture at the College of Hawaii (Mac- Caughey)	252
By Authority	66
Proclamation, Arbor and Conservation Day.....	342
Proclamations of forest reserves.....	164, 194, 277, 278
Cactus Discounted, The.....	243
City Beautiful, The.....	42
Coast Plant Inspection.....	97
Conservation :	
The Meaning of C. (Hosmer).....	152
The National C. Association.....	35
The Report of the Section on Forests, National C. Com- mission	12
Special C. Meeting.....	343
Conservation of Health (Hobdy).....	359
Coöperation	68
Coöperation (Wilcox)	82
Coöperative Cultivation	102
Cotton Gives Good Promise.....	67
Cotton investigations (See Rice and Cotton, etc.).....	..
Dairying	282
Damage Awarded Government for Destruction of Young Forest Growth	347
Dog Show, Proposed.....	38
Dry Farming	283

Editorial	1-3,
41, 43, 65, 67-70, 97, 99-103, 127, 167-170, 195-197, 221-224	
Entomology, Division of (reports)	
.....20, 54, 78, 115, 140, 176, 207, 250, 309, 330, 336	
Farmers' Bulletins	23
Farmers Ignorant of Loss	197
Fence Posts of Iowa, The	316
Fertilizers, Bulletin on	195
Foresters, Qualifications of	347
Forest Fire Protection, Need for Organized, Among Private Owners	316
Forest Reserves: Additions to Four	243
Additions to, on Hawaii and Oahu	277
Hauola	178
Hearings on	267
Kahoolawe	264, 278
Proclamations of	164, 194, 277, 278
Pupukea	128, 181
Reports of the Superintendent of Forestry on	
.....29, 178, 248, 264	
Forestry at the National Fair	44
Forestry, Division of (reports)	
.....17, 49, 80, 109, 170, 205, 227, 299, 326, 339	
Forestry in Minnesota	279
Forests, National, as National Playgrounds	283
For Mutual Instruction	41
Fruit Cup	230
Goats, Questions About	318
Hawaiian Poultry Association Prize Winners	7
Hog Cholera Serum	349

	PAGE
How to Send Crop Diseases by Mail (Ehrhorn).....	103
Index Vol. VI.....	16
Inoculation Against Hunger.....	209
Lime, Value of.....	281
Live Stock, Rules and Regulations.....	58
Making the Land Work.....	315
Ohia Lumber, The Closer Utilization of (Margolin).....	118
Paper from Bamboo.....	221
Pineapple Lemonade	242
Pinchot, Gifford (Hosmer).....	3
Poultry Association, Hawaiian.....	82
Poultry Notes	240
Poultry Show, The Fifth Annual (Porter).....	4
Potsdam Cakes	230
Public Lands	43, 81, 141, 184
Puna Lumbering Contract, The.....	24
Rice, About	343
Rice and Cotton Investigations in China and Japan, Report on (Krauss).....	143, 186, 210, 231, 271
Road Building (not headed).....	280
Rosella vs. Cranberry.....	198
Rubber Tree, The Jaquie Manicoba.....	238
Scabby Potatoes (Ehrhorn).....	104
School Gardens of the Hawaiian Islands (MacCaughey)....	285
Shield-budding the Mango.....	350
Stock Notes	241
Sugar Growing in the Philippines.....	344
Sylviculture (not headed).....	280
Tennessee, Pointers from.....	281
Tuberculosis and Fevered Calves.....	318
Wahiawa to Kahana, The Mountain Trail from (Mac- Caughey)	352
Water Investigation	221
Year Book 1908.....	23

ILLUSTRATIONS.

	PAGE
Botanical Laboratory, College of Hawaii.....	250
Compound Microscope	255
Ohia Forest, Puna (8).....	119-126
Persea Avacado	257
Rice processes (2) insert at.....	150
Scenes in Japan.....	187, 189, 191, 212, 213, 214, 215, 218, 219
Shield-budding the mango.....	351

INDEX

	Page.
Advertising domestic products.....	84
Agricultural status of islands.....	168
Agriculture and Forestry, Board of—finance.....	72, 132
meetings (see Contents)	
rules and regulations.....	108
Algaroba from Hawaii in Ceylon.....	196
Animal Industry.....	72, 108, 132, 205
expenses	294, 295
reports (See Contents)	
Arbor Day.....	18, 43, 107, 230, 326, 327, 339, 340, 342
Avocado pears	101
Awa, gathering of.....	203
Beneficial insects	208
Birds—permit to collect denied.....	321
protection of island	109
rare island	133, 205, 226
Botanical assistant's work.....	111
Botanical conditions in Hawaii.....	252
Botanical examples (see "Wahiawa to Kahana").....	352-358
Botanical exploration.....	174, 207, 228, 301, 327, 340
Botanical investigation	172
Botanist, work of.....	49
Bougainvillea vines	139
Business concerns—	
Alexander & Baldwin.....	77, 307
Brewer & Co., C.....	205, 267, 271, 362
Cant & Bolte.....	339
Castle & Cooke.....	108
City Mill Co.....	308
Club Stables	308, 325
Consolidated Cannery	354
Cornwell Ranch	325
Davies & Co., T. H.....	71, 108, 180, 202, 203
Fuze & Bruhn.....	65
Gay & Robinson	67, 68
Grove Ranch	323
Hackfeld & Co., H.....	108, 365
Hall & Son, E. O.....	1, 333, 368
Hamakua Mill Co.....	131, 179, 180, 229, 297
Hawaiian Commercial & Sugar Co.....	115
Hawaiian Development Co.....	24, 30, 43, 51, 339
Hawaiian Express Co.....	113
Hawaiian Pineapple Growers' Association.....	68
Hawaiian Meat Co.....	75, 293
Hawi Plantation Co.....	113
Hilo Railway Co.....	19, 339
Hind, Rolph & Co.....	108
Honolulu Plantation Co.....	113, 114, 229
Hutchinson Sugar Plantation Co.....	205
Kaeleku Sugar Co.....	109
Kahuku plantation	301
Kalihi Dairy	308
Kapapala Ranch	339

Business concerns—*Continued.*

	Page.
Kilauea Plantation Co.....	229
Kohala Ditch Co.....	106
Koolau Railway Co.....	183
Lanai Company	299, 325, 326
Laupahoehoe Sugar Co.....	112, 202
Lihue Plantation Co.....	134
Macmillan Company	346
Makaweli plantation	139, 175
Matson Navigation Co.....	321, 324, 335, 365
Missouri River & Northwestern Railroad.....	347
Mitsu Bishi Paper Mill Co.....	222
Mitsui Bussau Kaisha.....	151
Mokuleia Ranch	322
Molokai Ranch Co.....	132, 172, 173, 205, 299, 326, 327
Nahiku rubber plantation	331
Oahu Pineapple Co.....	49
Oahu Plantation Co.....	110
Oahu Railway & Land Co.....	17, 47, 50, 111, 300
Olaa Sugar Co.....	31
Pacific Development Co.....	339
Pacific Guano & Fertilizer Co.....	1
Parker Ranch	199, 207, 229, 297, 299, 326
Pond Dairy	298, 322
Puakea Ranch	325
Puna Sugar Co.....	31
Puuwaawaa Ranch	325
Raymond Ranch	77
Schuman Carriage Co.....	77, 113, 114
Thompson Settlement	229
Tonkin Pulp & Paper Co.....	222
Union Stock Yards.....	349
Volcano Stables & Transportation Co.....	19, 339
Waialae Ranch.....	305
Waialua Agricultural Co.....	50, 229, 301
Waipahu plantation	307
Wells Fargo Express.....	177, 308
Wight estate	73, 199
Woods estate.....	48, 71, 73, 106, 199, 202, 226, 292, 296
Business methods for small producers.....	91

Cabbage butterfly	117
California inspection of plants.....	97
Caterpillars ..	208
Cerebro spinal meningitis.....	134, 307
Chameleons ..	177
Chickens—eye worms in.....	78
incubator ..	241
Citrus fruit industry in California.....	93
Commissioner of Public Lands.....	129
Community enterprise	92
Conservation—bills in Congress.....	162
history of	155
points at issue.....	159
real questions	163
recent events	160
underlying principles	153
work by federal experts.....	169
Conservation meeting	341, 363

	Page.
Consumption, means to prevent.....	359
Coöperation	68, 82
Coöperative associations needed.....	97
Correction: "Hawaii Experiment Station"	
omitted at end of paragraph on shield-budding the mango.....	341
Cotton	67, 95 143
Cotton—at Shanghai	151
China and Japan compared with Hawaii.....	144
possibility of Japan obtaining from Hawaii.....	145
prices at Yokohama and Kobe.....	151
Cow, The Dual Purpose.....	241
Dairy Cattle	135
inspection of.....	292, 298, 305, 318, 320, 322, 335, 365
Demand for island crops.....	83
Diseases of crops.....	103
Diversified crops	82, 169
Editorial—	
About Rice	343
Additions to Four Forest Reserves.....	243
Agricultural education	349
Agricultural school in the Philippines.....	196
Alfalfa seed	246
Algaroba from Hawaii in Ceylon.....	196
An Australian Experiment Farm.....	313
Annual fodder bill	46
Applications for land	197
Bad potatoes	70
Bee keeping	46
Bulletin on bees.....	167
Bulletin on Fertilizers.....	195
California quarantine against Hawaiian vegetables.....	99
Coast Plant Inspection.....	97
Conservation	2, 46, 127
Coöperation	68
Coöperative Cultivation	102
Cotton Gives Good Promise.....	67
Cotton growing experiments	247
Cotton growing in Jamaica.....	224
Cotton hybrids	247
Cuban sugars in Europe.....	223
Cultivating home plot	43
Damage Awarded Government for Destruction of Young Forest	
Growth	347
Director Nesom's visit.....	223
Diversified industries	46
Division of Forestry.....	43
Dragon flies on rubber trees.....	196
Eucalyptus	100
Fence posts	317
Forest products shipped from Hawaii.....	317
Forestry at National Fair.....	44
Forestry in Minnesota.....	279
For Mutual Instruction.....	41
Fruit growing circular.....	99
Fruit steamers	46
General farming and animal industry.....	46

Editorial—Continued.

	Page.
German cotton process.....	223
Hawaiian number of Tropical Life.....	101
Hawaiian Poultry Association.....1,	69
Hawaiian subjects in Tropical Life.....	170
Hawaii mention abroad	127
Honey shipments from Hawaii.....	317
Hog Cholera Serum	349
How to kill and bleed market poultry.....	275
Independent homes	65
International rubber exhibition.....	170
Japanese cultivators	70
Java white sugar.....	245
Kahoolawe Forest Reserve.....	245
Land and liberty.....	65
Mindanao Herald industrial number.....	196
Mr. Krauss's report.....	127
National forests for outings.....	312
New Potato Disease, A.....	103
Nitrates from air.....	223
Ocean freight accommodation.....	46
Paper from Bamboo.....	221
Peanuts for hogs.....	341
Pineapple shipping	224
Plants ordered from Hawaii to Philippines.....	101
Pointers from Tennessee.....	281
Publications	43
Public Lands	43, 224
Reports of chiefs.....	100
Rock's treatise on Hawaiian plants.....	100
Rough usage of cattle.....	46
Rubber pests	196, 246
The Morgan horse	276
Soil bacteria	276
Soils for pineapples.....	245
Special Conservation Meeting.....	343
Sugar Growing in the Philippines.....	344
Texas fever	99
The Cactus Discounted.....	243
The City Beautiful.....	42
The Forester	3, 127, 247
The Morgan horse	276
Tobacco of Cuba and the Philippines.....	223
Transportation of animals.....	43
Water Investigation	221
Woolless sheep	224, 276
Yearbook for 1909.....	167
Eggs in demand.....	85
Eggs, time of hatching.....	240
Entomologist, employment of assistant.....	132
Entomology	71
expenses	294, 295
reports (see Contents)	
Eucalypts	137, 171, 204, 206, 228, 362
Eucalyptus	139, 173, 175
investigations	49, 110, 136, 171
tests of locally grown.....	111
Ewa forest reserve.....	204, 250, 271, 277
Experiment garden, Makiki.....	81
Exposition, Alaska-Yukon-Pacific.....	108, 111

	Page.
Field crops for Hawaii.....	237
Forest destruction by cattle.....	130
Forest extension	50
Forest planting and tree distribution.....	110, 173, 206
Forest planting plans.....	136, 137, 171, 205
Forest reserve boundaries.....	112
Forest reserve hearings	267
Forest reserves.....	106, 128, 131, 137, 172, 173, 178, 194, 202, 204, 206, 225, 228, 243, 245, 264, 292, 301, 339, 362
Forest reserves, income from.....	335
proclamations of	277
reports on	248, 264
Forest tree seed.....	51
Forestry	225
dying koa trees.....	334
expenses	294, 295
experimental tree planting.....	340, 362
federal funds for.....	340
propagating work	362
reports of Division of (see Contents)	
sub-stations	107
tree growth at Kapapala Ranch.....	339
Forests of Hawaii for outings.....	312
Fowls, water for	241
Fruit cup	230
Garden pests	367
Garden truck	89
Glanders	59, 63, 73, 77, 114, 133
Government bodies—	
Agriculture and Forestry, Board of Commissioners of (see Con- tents)	343
finances of.....	292, 294, 334, 365
salaries and expenses of.....	294, 295
Agriculture, U. S. Department of.....	99, 100, 102, 103, 150, 167, 201, 275, 276, 283, 316, 317, 341, 343
Animal Industry reports (see Contents)	
Animal Industry, U. S. Bureau of.....	60, 65, 109, 200, 294, 298, 318, 321, 349, 365
Board of Health	200
California Board of Horticulture.....	178
California Commission of Horticulture.....	79, 338, 364
Chinese Government	147
Commission on Diversified Industries.....	82
Entomology, Division of (see Contents)	
Forestry, Division of (see Contents).....	101
Forest Service	155, 162
Geological Survey	155, 221
House of Representatives.....	268
Inland Waterways Commission.....	155, 156
Interior Department	162, 163
Milk Commission	323
National Conservation Commission.....	156
Plant Industry, Bureau of.....	344
Philippine Islands Bureau of Agriculture.....	101
Reclamation Service	155, 269
Supervisors, Board of...74, 133, 135, 200, 229, 292, 298, 307, 320, 335	
Survey office	179, 199, 292
Treasury Department	221

	Page.
Governor Carter's administration.....	271
Governors' Conference	35
Guinea pigs	114
Hamakua forest reserve.....	204, 228, 243, 248, 250, 271, 277, 301
Hana forest reserve	271
Hauola forest reserve.....	131, 137, 173, 178, 194, 206, 228
Hauula forest reserve	362
Hawaiian products	85
Hen, The Setting.....	240
Hilo forest reserve.....	203, 204, 249, 271, 277, 301
Hitchcock berry (see thimble berry)	
Hog cholera and swine plague.....	113
Home market for food products.....	169
Honey bee	167
Hornfly parasites	117, 208
Horticultural conditions in Hawaii.....	254
Horticultural products of Hawaii.....	256
Institutions—	
California State Insectary	178
Canton Provincial Experiment Station and College of Agriculture.	144
College of Hawaii.....	1, 109, 112, 169, 252, 282, 285, 352
College of Hawaii—botanical and horticultural courses, 258, botanical and horticultural functions, 256; credit, 260; dendrology, 262; elementary bacteriology, 262; equipment, 258; graduate work, 261; horticulture, 262; laboratory and field work, 259; lectures, 259; library reference work, 259; morphology and physiology of plants, 261; propagation of plants, 263; recitations, 259; research work, 260; special work, 260; systematic botany, 261; tropical and subtropical fruits, 263.	
Experiment gardens at Fort Brown.....	198
Experiment stations in Japan.....	152, 186, 210, 220, 231, 238
Government Nursery.....	18, 65, 171, 206, 326, 328, 340
Hawaiian Sugar Planters' Experiment Station.....	170, 309, 319, 338, 367
Hawaii Experiment Station.....	1, 69, 127, 140, 169, 247, 302, 337, 343, 368
Hilo Boarding School	286
Hilo Nursery	327, 339
Hongkong Botanical Gardens.....	147, 151
Imperial Agricultural College of Japan.....	210
Kamehameha Schools	286
Lahaina Industrial School.....	286
Makiki Station.....	139, 175, 230, 303, 304, 329
Molokai Leper Settlement	74
Museum of Vertebrate Zoölogy, University of California.....	109
New York Post-Graduate Medical School and Hospital.....	361
Normal and Training School.....	286
Nuuanu Station.....	81, 139, 171, 230, 303, 304, 329
Oklahoma Station	246
Quarantine Station.....	74, 77
Tennessee Experiment Station.....	281
Territorial Archives	111
University of Minnesota.....	279
University of Tennessee.....	282
Veterinarian Medical Association, California.....	227
Wagga Experiment Farm.....	313
Yale Forest School.....	162
Waialeale Industrial School.....	286

	Page.
Interview with commission man.....	87
Ironwood trees.....	131, 139, 175, 179, 228
Island produce	83
Japan visited	151
Kahoolawe forest reserve.....	225, 245, 264, 301
Kahoolawe, removal of stock from.....	363
Kahoolawe reservation, reasons for reclaiming.....	266
Kau forest reserve.....	204, 248, 249, 271, 277, 301, 362
Koa seed	363
Koa trees	129
Kohala forest reserve.....	70, 106, 110, 199, 202, 364
cost of	296
Koolau forest reserve.....	248
Ladybirds	116, 117, 178, 310
Ladybugs	79
Lauhala trees	129
Lehua trees	129
Limes, not enough.....	85
Live Stock—Act relating to, 62; importation of, 59, 75, 134, 323; im- ports, 114; inspection, 58, 75, 112; inspection of imported, 323; inspection on Maui, 135; quarantine at Hana and Honuapo, 108, 113, 132; quarantine at Hilo, 113; quarantine at Honolulu, 113, 134; sanitary condition in Territory, 115.	
Logging Contract, The.....	24
Lualualei forest reservation.....	226
Magney plants	101
Matting industry in China.....	149
Matting rushes	236
Measly pork	242
Meat of tuberculous cattle.....	293
Mediterranean fruit fly.....	336, 364, 367
Midway Island, parasites for.....	339
Milk inspection	321, 323
Milk ordinance	74, 133, 135, 200
Molokai forest reserve.....	137, 172
Ohia lumber and its uses.....	118, 126
Ohia wood	51, 107
Orchids from Manila.....	116
Organic Act amendments.....	168
Organization for farmers.....	96
Organizations—	
American Board of Missions.....	286
American Poultry Association.....	6
Ceylon Agricultural Society	196
Hawaiian Poultry Association.....	1, 7, 20, 69, 82, 341
Hawaiian Rubber Growers' Association.....	19
Hawaiian Sugar Planters' Association.....	209, 341, 343, 363
Irrigation Congress	161
Jamaica Agricultural Society.....	224
Kennel Club	38
Maui Live Stock Association.....	135
Minnesota Forestry Association.....	279
National Conservation Association.....	35, 158, 326
Nilgiri Planters' Association	246
U. S. Agricultural and Industrial Exposition.....	44

	Page.
Parasites liberated	117, 209
Peopling the land	167
Personal—	
Ables, L. C.....	5, 33
Alexander, Miss Annie M.....	109, 133, 205, 226, 321
Anstead, Rudolph D.....	196, 246
Atkinson, Acting Governor A. L. C.....	248, 277
Austin, Mr.....	331
Awardees of public lands.....	43, 81, 141, 184
Aylett, William	335
Bailey, Mr.....	306
Baker, Dr. Geo. S.....	65, 323
Baldwin, Manager.....	139, 175
Ballinger, Secretary.....	160, 161, 162, 163
Bass, John F.....	37
Baumberger, J. P.....	208, 251
Bellina, Chas.....	306, 308, 325
Birdsall, Katharine Newbold.....	209
Birdseye, C. H.....	221
Blackman, L. G.....	3, 16, 51, 74, 337
Boardman, O. T.....	181
Bond, Dr. B. D.....	48
Brown, A. M.....	306
Brown, George	308
Brown, Raymond C.....	82
Bryan, Wm. A.....	109, 133
Buchholtz, Mr.....	287
Bull, Mr.....	307
Cameron, C. R.....	196
Campbell, Marston.....	22,
24, 28, 29, 47, 51, 62, 70, 73, 81, 106, 131, 139, 175, 180,	
181, 184, 199, 200, 202, 225, 267, 292, 296, 319, 334, 338, 343,	361
Carnes, E. K.....	79, 178
Carter, A. W.....	75, 199, 202, 297, 299, 319
Carter, F. W.....	308
Carter, Gov. Geo. R.....	277
Case, Dr. Howard N.....	65, 78
Chamberlain, Daniel	285
Charlock, W. H.....	38
Clark, Byron O.....	181
Clark, Leslie	181
Coburn, F. D.....	246
Colley, B. W.....	208
Compere, George	79, 208
Conradt, C. C.....	264, 268
Cook, Captain	285
Cooke, C. Montague.....	7, 82
Cooke, Geo. P.....	137, 172
Cooke, J. P.....	73
Cooper, Judge	337
Craig, J. H.....	7, 82
Cranfield, George	38
Crawley, J. T.....	101
Crosby, Dick J.....	349
Cummings, John	139
Curry, Dr.....	308
Davies, T. Clive.....	199, 202
Davis, Mrs.....	306
Delegate to Congress (see Kalaniana'ole).....	50
Denison, H. N.....	111

Personal—Continued.

	Page.
Dillingham, Harold	306
Dolliver, Senator	162
Donaghho, J. S.....	352
Dorset, M.....	23
Dowsett, J. M.....47, 70, 106, 131, 199, 200, 202,	292
Du Bois, Coert.....	362
Dunn, S. T.....147,	151
Eames, A. W.....	368
Eekart, C. F.....	170
Edwards, Dr.....	306
Ehrhorn, E. M.....19, 21, 53, 71, 78, 80, 116,	
141, 178, 209, 227, 250, 310, 311, 319, 331, 334, 336, 338, 361,	367
Eliot, Dr. Chas. W.....	35
Eliot, Dr. H. B.....108, 113, 205,	323
Ellsworth, E. K.....	181
Feler, Mr.....	19
Fern, Mayor	4
Fitzgerald, Dr.....77, 108, 113, 115, 134, 135, 200,	323
Forster, Ralph G. E.....	139
Fraser, D.....	352
Frear, Governor.....4, 181, 243, 245, 267, 277, 301, 335,	342
Freer, Dr. Paul C.....	344
Fullaway, D. T.....	337
Fuller, Stuart	146
Gallagher, Mr.....	308
Gartley, Alonzo	267, 343
Geerligs, H. C. P.....	245
Gere, G. H.....	18
Gilbert, Lee St. John.....	226
Gillett, Governor	99
Ginaca, Louis A.....	181
Glaisyer, L. R.....134, 161, 200,	202
Glavis, L. R.....	161
Goodale, W. W.....	50
Gooding, Dr.....	247
Governor, The (see Frear).....106,	109
Graves, Henry S.....	326
Greene, J. J.....6,	82
Guild, John.....	6
Haley, F. E.....	181
Hall, A. D.....	316
Haughs, David	66,
100, 139, 171, 173, 181, 206, 228, 230, 267, 300, 303, 327, 329,	331
Henry, William	38
Herbert, Allan	267
Hess, Dr. O. B.....	65
Higgins, J. E.....139, 341,	352
High, Dr. C. B.....5,	82
Hillman, F. H.....	23
Hind, John	113
Hind, Robert	325
Hitchcock, Prof. C. H.....	343
Hobdy, Dr. W. C.....	343
Holt, Valentine	7
Hosmer, Ralph S.....20, 23,	
35, 38, 51, 52, 66, 100, 127, 129, 131, 138, 181, 199, 200, 202,	
203, 207, 226, 229, 250, 267, 271, 302, 327, 328, 331, 341, 343,	361
Howe, F. W.....	350
Hughes, G.....	111

Personal—Continued.

	Page.
Hutchinson, Dr.....	276
Isenberg, D. P. R.....38, 67, 70, 74, 75, 77, 106, 135, 201, 305, 307	
Jeffrey, California State Comr.....	98, 99
Johnson, Col. Sam.....	51
Joss, Dr. E. C.....	65
Kalaniana'ole, Hon. J. K.....	23, 302
Kamaioipili, S. K.....	29
Kanabata, K.....	151
Kapihe, David	66
Kapuniha'ana, J. K.....	204
Kellner	210
King George V.....	170
Knapp, S. A.....	344
Knopf, Dr. Adolphus.....	361
Koebele, A.....	21, 55, 117
Kotinsky, Jacob	48, 53
Kozai, Director	152
Krauss, F. G.....127, 170, 186, 231, 302, 333, 343,	368
Li, Dr. Y.....	144
Lindsay, Alexander	200, 335, 365
Littlejohn, C. T.....	38
Loew	210
Logan, Daniel	3, 51, 74, 133, 335
Lomba, B.....	308
Loney, Nicholas	345
Low, E. P.....225, 264, 268,	363
Lowrey, F. J.....	331, 334
Lyons, Dr. H. L.....	319, 367
McCaughy, Prof. Vaughan.....	252, 285, 352
Maiden, Dr. J. H.....	49, 111
Margolin, Louis.....	
.....17, 48, 49, 107, 110, 136, 171, 181, 200, 204, 321,	362
Marsh, D. H.....	209
Marsh, H. O.....251, 310, 312, 331, 334,	368
Martin, W. F.....	221, 226
Matheson, R. O.....	19
McBryde, Alexander.....	306
McBryde, Walter D.....	300, 310, 327, 340
McCarthy, Mrs. Chas.....	139
McClellan, W. H.....	335
McClintock, Mr.....	147
McStocker, F. B.....	28, 29
McVeigh, J.....	38
McVeigh, J. D.....	74
Melvin, Dr. A. D.....	109, 321, 335, 365
Meyers, Mr.....	203
Monsarrat, Dr.....	298
Monsarrat, Julian.....	339
Morrison, Mr.....	330
Mott-Smith, Secretary and Acting Governor.....	
.....62, 81, 173, 180, 184, 194, 206, 228, 278,	342
Nesom, G. E.....	223
Newell, Inspector Matthias.....	19, 21 58,
70, 78, 116, 140, 208, 227, 269, 300, 309, 319, 327, 331, 339,	367
Norgaard, Dr. Victor A.....	23, 65, 72, 75,
78, 108, 115, 134, 136, 199, 200, 227, 292, 298, 319, 325, 334,	365
Officers U. S. Agricultural and Industrial Exposition.....	44-46
O'Grady, J. E.....	314
Owen C. G.....	110, 136, 139, 171

Personal—Continued.

	Page.
Pardee, A. M.....	352
Perkins, Dr.....	338
Petrie, T. H.....	47, 365
Piltz, Captain	208
Pinehot, Gifford.....	3, 160, 162, 163
Pogue, W. F.....	203
Pond, P. M.....	298
Porter, Prof. Briggs E.....	1
Pound, Orange	350
Price, Overton	12, 162
Prize winners poultry show.....	7-12
Rath, J. A.....	323
Raymond, Dr.....	67
Robinson, A.....	308
Rock, J. F.....	48, 49,
51, 53, 100, 111, 138, 172, 174, 207, 228, 297, 301, 327, 340,	362
Roosevelt, President.....	3, 12, 96, 155, 156,
Rothwell, J. G.....	308
Russell, Dr.....	276
Sarcoli	244
Schuman	308
Secretary of Agriculture.....	64, 99
Sedgwick, Mrs.....	308
Sharp, Tom	38
Shaw, A. C.....	162
Shaw, Seeley I.....	82
Sherman, M.....	308
Shipman, W. H.....	30, 203
Shop, Wo Fung.....	147
Smith, E. C.....	170
Smith, Hon. W. O.....	343
Smith, Jared	170
Stackable, E. R.....	109
Sullivan, C.....	308
Superintendent of Public Works.....	106
Swezey, O. H.....	117
Taft, President	3, 159, 162
Taylor, E. Alexis.....	46
Terry, F. W.....	209, 338
Thurston, L. A.....	28, 29
Tong, Prof. Y. H.....	144
Tong T.....	147
Tripp, Captain	308
Turrill, Mrs. F.....	308
Ulpiani	244
Vanhuizen	73, 114, 134, 294
Von Holt, H. M.....	45, 50, 74, 106, 225, 292, 296, 319, 334,
Walker, H. E.....	267
Walker, Herbert S.....	344
Wall, W. E.....	5, 82, 308
Waterhouse, Albert	106, 131, 199, 200, 202, 225, 292, 296, 319, 334,
Watkins, Morton	318
Watson, Mr. (Jamaica).....	224
Webster, P. J.....	352
Weedon, W. C.....	5, 6, 29
Wheeler, Mr.....	47
White, Clarence G.....	276
White, W. J.....	38

Personal—Continued.

	Page.
Whitney, Guilford H.	180
Wilcox, Dr. E. V.	67, 73, 82, 170, 343
Wilder, Gerrit P.	7, 100, 110, 138, 174, 329
Williams, Geo. H.	31
Wilson, James	64
Winston, E. C.	181
Wodehouse, E. H.	73
Woodberry, T. D.	321
Wright, Mr.	19
Pests.	55, 116, 140, 177, 207, 251, 309, 311, 330, 334, 336, 366
Pineapple Lemonade	242
Plant and tree distribution.	101, 174, 227, 229, 302, 303, 328
Plants, exchange of	100
Plants from abroad.	110
Plant inspection	115, 140, 177, 207, 250, 309, 330, 366
Polipoli spring reserve	110
Potato fertilizer	105
Potato fungus	103
remedies for	105
Potato scab	366
Potsdam Cakes	230
Poultry Show, The.	50
Publications—	
Advertiser, The	19, 38, 69, 267, 293
Agricultural Gazette of N. S. W.	313
Agricultural News	247
Bulletin Imperial Institute	243
Bulletin Japan Agr. Coll.	211
Bulletin Japan Exp. Stations.	217
Chi Wu Ming, Yu Ke Jum.	151
Chinese Repository	150
Collier's Weekly	161
Enumeration of Hawaiian Plants.	111
Evening Bulletin	182, 267
Far Eastern Review	222
Farmers' bulletins	23
Forester, The.	3, 51, 108, 247, 297, 302
Garden Island, The.	127
Harper's Magazine	316
Harper's Weekly	209
Hawaiian Star	182
Hawaii Herald	267
Horse, The Regeneration of the Morgan.	276
International Sugar Journal.	245
Journal Association German Engineers.	350
Journal d'Agriculture Tropicale.	245
Journal Jamaica Agricultural Society.	240, 241
Mindanao Herald	196
Minnesota Forester	279
Nung Ching Ysinen Shu.	150
Philippine Agricultural Review.	101, 223
Philippine Journal of Science.	345, 346
Pien Miu Tu-tswan.	151
Publications of colleges of agriculture and experiment stations of Japan	271
Reports Botanical and Forestry Department of Hongkong.	151
Rural New Yorker.	318, 319, 350
Sacramento Union	97
Southern Workman	285

Publications—*Continued.*

	Page.
Sugar Industry in Island of Negros.....	344
Tropical Agriculturist	196, 238
Tropical Life	101, 246
Yearbook, Dept. of Agriculture.....	302
Public Lands Department.....	43, 81, 141, 184
Pupukea forest reserve.....	106, 109, 110,
112, 128, 130, 137, 138, 164, 171, 172, 181, 206, 228, 229, 300,	365
expenses of	296
Quarantine of horse stock.....	62
Rattan palm	139
Redwood, Cal.....	363
Rice—agricultural practice in Japan.....	231
and cotton investigations in China and Japan.....	143
breeding in Japan.....	188
cultural methods in China.....	147
fertilization experiments	210
food value of.....	344
insects and fungus diseases in Japan.....	190
manures	231, 235
references to publications.....	271
rotation of crops with.....	236
varieties grown in China.....	145
varieties in Japan	186
Rubber—international exhibition	170
the Jequie Manicoba tree.....	238
tree pests	196
Sandalwood ..	129
School gardens—books relating to.....	291
characteristics ..	286
development of ..	285
management of ..	289
outlook for work.....	291
point of view ..	288
race factor ..	287
vegetables suitable for.....	290
Seaweeds for food.....	254
Seed—collection of.....	80, 139, 175, 230, 303, 304, 329
congressional vegetable	112
from abroad	100, 110, 138, 174
Sheep and swine inspection.....	61
Snakes ..	251
South Kona forest reserve.....	362
Sweet potato demand.....	84
Thimble berry.....	51, 52, 54, 319, 331, 367
Traction plowing	102
Tree planting.....	101, 107, 109, 110, 227, 299, 301, 326, 362
Tuberculosis—(animal).....	59, 135, 200, 321, 322
(human) alphabet for school children.....	360
Tunnel for water.....	226
Turkeys ..	240

	Page.
Vegetables—may be grown by laborers.....	90
Waihou spring reserve.....	110
Water reserves	163, 173
Wax and varnish trees of China.....	150
West Maui forest reserve.....	362
Yearbook	50, 302

VOL. VII

JANUARY, 1910

No. 1

Price, 10c. Per Copy; Per Annum, \$1.00; Foreign, \$1.25.

THE
Hawaiian Forester

AND

Agriculturist

A MONTHLY MAGAZINE

OF

Forestry, Entomology and Agriculture

ISSUED UNDER THE DIRECTION

OF THE

BOARD OF COMMISSIONERS OF AGRICULTURE
AND FORESTRY.

PUBLISHED MONTHLY.

Entered as second-class matter at the Post office, at Honolulu, Hawaii.

ADDRESS ALL COMMUNICATIONS TO
EDITOR.

P. O. BOX 59
HONOLULU, H. T.

For business relating to advertising or subscriptions, address

HAWAIIAN GAZETTE CO., LTD., Publishers,
VON HOLT BLOCK 65 S. KING ST., HONOLULU, HAWAII.

CONTENTS:

	Page
Editorials—	
The Poultry Show	1
The Conservation Controversy.....	2
Change of Editors.....	3
Gifford Pinchot.....	3
The Fifth Annual Poultry Show—By Briggs E. Porter	4
List of Prize Winners	7
The Report of the Section on Forests	12
Index—Volume VI	16
ROUTINE REPORTS—BOARD OF AGRICULTURE AND FORESTRY:—	
DIVISION OF FORESTRY.....	17
DIVISION OF ENTOMOLOGY	20
DIVISION OF ANIMAL INDUSTRY.....	22
The Puna Lumbering Contract—	
The Logging Contract	24
Report of Superintendent of Forestry	29
The National Conservation Association.....	35
Proposed Dog Show	38

OFFICERS AND STAFF OF THE BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY.

COMMISSIONERS.

Marston Campbell, *President and Executive Officer.*
J. M. Dowsett D. P. R Isenberg
H. M. von Holt

DIVISION OF FORESTRY.

Ralph S. Hosmer, *Superintendent of Forestry and Chief Fire Warden.*
David Haughs, *Forest Nurseryman.*
Joseph F. Rock, *Botanical Assistant.*
Louis Margolin, *Forest Inspector.*
David Kapihe, *Forest Ranger for Tantalus.*

DIVISION OF ENTOMOLOGY.

Edward M. Ehrhorn, *Superintendent of Entomology and Chief Inspector.*
 Albert Koebele, *Consulting Entomologist.*
 Jacob Kotinsky, *Assistant Entomologist.*
 D. B. Kuhns, *Inspector's Assistant.*
 Louis Lewis, *Assistant in Inspection.*
 Fred Muir, *Beneficial-Insect Collector.*
 Bro. M. Newell, *Fruit and Plant Inspector, Hilo, Hawaii.*
 Robert R. Elgin, }
 W. O. Aiken, } *Honorary Fruit*
 W. D. McBryde, } *and Plant Inspector*
 Dr. W. B. Deas, } *at*
 Wm. Robb, } *Mahukona, Hawaii.*
 } *Kahului, Maui.*
 } *Koloa, Kauai.*
 } *Hana, Maui.*
 } *Lahaina, Maui.*

DIVISION OF ANIMAL INDUSTRY.

Victor A. Nörgaard, *Superintendent of Animal Industry and Territorial Veterinarian.*
L. N. Case, *Assistant Territorial Veterinarian.*
J. C. Fitzgerald, *Deputy Territorial Veterinarian for Maui.*
John Vanhuizen, *Live Stock Inspector.*
A. R. Glaizyer, *Deputy Territorial Veterinarian for Kauai.*

CLERKS AND STENOGRAPHERS.

Miss Melika Peterson, Miss E. M. Kuhn

ACTING EDITOR OF THE "FORESTER."

Ralph S. Hosmer

LIBRARIAN

Miss Ella K. Dayton

THE HAWAIIAN FORESTER *and* AGRICULTURIST

VOL. VII

JANUARY, 1910

No. 1

The special feature of interest this month in the annals of agriculture in Hawaii is the Fifth Annual Exhibition of the Hawaiian Poultry Association, held in the National Guard Armory in Honolulu, January 12 to 15 inclusive. Each year witnesses a more and more creditable display of birds and a more intelligent interest in the objects for which the Association stands. Elsewhere in this issue may be found the list of the prize winners at the show and also an article on the merits of the birds exhibited, by Professor Briggs E. Porter, of the College of Hawaii. In his capacity of Judge of the Show, Professor Porter had the opportunity of making a critical study of the birds entered in competition. In this article he brings out a number of points of interest to local poultry fanciers.

Following the usual custom educational exhibits illustrating the work of the two stations were prepared by the Hawaii Experiment Station and by the Board of Agriculture and Forestry. In the exhibit of E. O. Hall & Son, an incubator in full operation attracted much favorable comment, especially from the children, who kept the obliging attendant busy turning his electric light on the little chicks who were hurrying out of their shells to be counted as members of the show. The Pacific Guano and Fertilizer Company, as usual, had a well arranged display of samples of the output of their factory.

Owing in large part to unfavorable weather conditions the attendance was not as large as the merits of the show deserved. This is the more to be regretted because the Poultry Association is performing a valuable public service in getting up the highly creditable series of exhibitions that it now has to look back upon. If only the men interested in other kinds of live stock would be equally active in promoting their specialties, the Territory would be decidedly the gainer, for such happy rivalry as is awakened by exhibitions like those of the Poultry Association can but lead not only to the improvement of locally owned stock, but also to a strengthening of the whole industry.

As this number of the FORESTER goes to press there are being received in Honolulu the reports of recent notable happenings in the Conservation controversy on the mainland. It would be out of place at this time to discuss in these pages the probable effect of the changes of personnel in the Forest Service, or to speculate upon their bearing on the Conservation movement. But this may, and perhaps ought once more to be said, that the issue now before the American people is not a matter of individuals but a question in which principles of fundamental importance are at stake. The great majority of thinking men in the United States are practically at one on the necessity of conserving the sources of natural wealth that still vest in the Nation, but there is very great difference of opinion as to how this may best be done. This in itself is a grave question, but the real issue, the crux of the whole problem is the question by and for whom are the natural resources to be exploited? Are they to be rightly developed and legitimately used in the interest and for the benefit of all the people, or are they to go to swell the coffers and enhance the power of the favored few? This is the real bed rock question. It is a simple and clear cut issue. It must not be lost sight of.

The fight is no new one. It is but a new phase of the old, old struggle of the People vs. Predatory Wealth. But seldom before has the issue been so clearly defined or have the stakes been of such tremendous importance. With the rapid increase of material wealth in recent years, resulting from the application of science to industrial life, there have been made possible combinations that were unthought of a few decades ago. The time has arrived when the ultimate control of the sources of wealth has become a moral as well as an economic problem, for in the last analysis the issue turns on whether this Nation is to exist and be carried on in the interest of all the people, or whether it is to be run by money, for profit.

In the great battle that is now on every effort will be made to becloud the main issue and to distract attention to minor occurrences. Raising dust is one of the most effective ways of confusing those who are watching a contest. Irrelevant interruptions and bold misstatements are to be expected, while personal differences will be made to occupy a prominent place. But it is not a question of details or of quarrels between individuals. Whether this or that government official is found culpable, or is "white-washed"; whether he is removed or exonerated has but an incidental bearing on the great and vital question that is being fought out.

In a fight of this sort public sentiment and an awakened public conscience are more potent than dollars. Let the main question be kept clearly before the country until the great mass of the American people knows the issue as it really is, and there can and will be but one outcome.

With the conclusion of Volume VI of the FORESTER, Mr. Leopold G. Blackman retires from the post of editor, after five years of efficient service. Mr. Blackman's resignation is caused by increasing duties resulting from the growth of Aliiolani College. At a meeting held on January 19, 1910, when his resignation was regretfully accepted, the members of the Board of Agriculture and Forestry expressed hearty appreciation of the great utility of Mr. Blackman's services and of the increasing value of this magazine as a factor in its special field.

Mr. Blackman will be succeeded as editor by Mr. Daniel Logan, who will take charge of the FORESTER next month. A newspaper man of long experience in this Territory, who has always taken much interest in the subjects with which this journal has to do, Mr. Logan may confidently be expected to give to the readers of the FORESTER a magazine that will not fall below the standard that has been set by Mr. Blackman.

GIFFORD PINCHOT.

January, 1910, is a month that will be memorable in the history of American forestry. The summary dismissal from office by President Taft of Gifford Pinchot, the Forester of the Department of Agriculture and Chief of the Forest Service, is an event that is of far-reaching importance.

This is not the time nor are the facts in hand for a discussion of this latest phase of the conservation controversy. But on the other hand this opportunity is one that the acting editor cannot let pass without bearing tribute to the services that Mr. Pinchot has rendered to the nation during the past twelve years.

The work that Gifford Pinchot has done is too well known to need again to be described here. To him is due the major share of the credit for building up the Forest Service from a mere handful of gatherers of statistics and propagandists into the effective agency for the service of the people that it is today, when over 194,000,000 acres of national forest are under efficient administration and the people of the Nation are being helped in very many other ways to a wiser use of their forest resources. And not only in forestry, but in the larger field of Conservation is it to Mr. Pinchot that much of the credit belongs. President Roosevelt has justly been praised for getting the Conservation Movement actually under way, but what did Mr. Roosevelt say in his opening speech at the Conference of Governors in 1908: "To the initiative, the energy, the devotion to duty and the far-sightedness of Gifford Pinchot we owe much of the progress we have already made in handling this matter of the coördination and conservation of natural resources."

In the dismissal of Mr. Pinchot, the government loses a public servant whom it will be imposible to replace. His energies will not cease to be directed to furthering the interests of forestry and of conservation, but they can no longer be exerted through government channels. Favored by the possession of wealth and endowed with gifts that would open to him almost any door, Mr. Pinchot has steadfastly turned his back on the allurements of leisure to take up the task—to use one of his own trenchant phrases—of bringing “common sense to common problems for the common good.” For what he has already done and for the activities that he has set in motion the people of the United States owe Gifford Pinchot wholesouled and lasting gratitude. It is a debt that cannot be forgotten.

RALPH S. HOSMER.

THE FIFTH ANNUAL POULTRY SHOW.

BY BRIGGS E. PORTER, *Judge of the Show.*

The exhibition of poultry this year at the National Guard Shooting Gallery was without doubt the most successful that has ever been held in Honolulu. From start to finish the whole affair came off in perfect order and was especially pleasing to all those who attended. Then, bearing in mind the work and detail in the successful management of a poultry show, one cannot fail to give the highest commendation to the workers for their success.

Few show managers have worked out the details to the advantage of the birds so well as those here. The birds were placed in the most approved coops for viewing and the classes were so arranged that the student and fancier could make comparisons with ease and satisfaction. The white canvas in the construction of the ample sized coops was a commendible feature in that the lines of the birds could be obtained at once. This latter feature was of great assistance to the judge and in that way helped to open the show on time.

Considerable interest was added to the exhibition this year on account of the additions to the list of awards. The cups offered by Governor Frear and Mayor Fern were beauties and much admired by every visitor to the show. The awarding of such beautiful trophies as these and others which were on exhibit at the show cannot help but add new zest and enthusiasm for the best that the poultry fancier can produce.

Poultry excellence is a fine art worthy of the highest admiration and greatest praise. But, it involves great care as to details, experience and the application of the best methods of breeding. And from the quality of the birds exhibited, it is quite evident that the breeders here understand the value of choice selec-

tions and matings. In fact, no breeder distinguished himself more royally than did Mr. W. C. Weedon, who won the silver cup for having the largest number of birds scoring 90 points and over.

The show was not large, but what it lacked in numbers it made up in quality. There were eighty-one classes of poultry and forty-six of pigeons, which fact alone shows that the poultrymen have quite a taste for variety. Some classes were not large, but well represented, while others were strong in competition, especially with the hen and pullet classes of the Rocks, Leghorns and Minorcas.

This year the awards were placed by the use of the official score card, instead of comparison, and the score together with the exhibitor's name, was published in the catalogue.

THE PLYMOUTH ROCKS.

The barred Plymouth Rocks made a very fine showing. These strong, hardy birds, as a breed, always make good. Some of the entries showed especially fine barring, yet others lacked the proper color definition in the feather to meet the requirements of the standard.

The White Plymouth Rocks represented some remarkable fine specimens of fowl. The exhibit of Dr. C. B. High was especially notable for the reason that it won both of the cups given by Governor Frear and Mayor Fern. The first prize cock received considerable commendation by the best breeders. He is a bird of fine carriage, medium in height, strong in back and nicely built up in the tail where so many Rocks fail. Dr. High's fowls were a fine example of what conditions means on the score card; his first prize pullet received the special prize for being the best conditioned bird in the show. It was believed there would be strong competition in this variety, but the veteran breeders and exhibitors, Mr. L. C. Ables and Mr. W. E. Wall did not enter the contest with Dr. High for the beautiful trophies which the latter has won.

THE LEGHORNS.

The Leghorns, the notable egg producers, came out in fine form. The Browns, which were absent last year, came out with some entries which were striking in their color markings. The Whites, which had the largest list of entries of any variety in the show, were very popular with the visitors. Here two entries were disqualified because of squirrel tails. This variety does not have the length of body as the Minorca nor should it approach the Bantam type. Several individuals in the pen exhibits were very small and it is hoped that the new book of standards for poultry will prescribe a definite weight for birds of this breed as it does for the other varieties. That such is forthcoming is the belief of many breeders. As for the buff variety only the young

birds made a showing. The true uniform buff coloring which is so highly prized by breeders is acknowledged to be one of the hardest colors to get and retain in poultry.

THE MINORCAS.

This is one of the popular breeds of chickens and appears to gain new favor here among the breeders. It is a breed not only worthy the admiration accorded it, but full of utility value. The eggs are good sized and quite uniform in color, while the bird is not too small for table use and still not too large for an active worker. The Blacks had more breeders contesting for prizes than any other variety in the show. The birds of Mr. J. J. Greene were not in competition this year because the lotting at home had necessitated the clipping of the wing. Mr. Greene's fowls are especially valuable and are from the bluest blood of this breed in America. The Whites claimed their share of attention and were chiefly exhibited by Mr. John Guild and W. C. Weedon. The value of this breed should claim the attention of more breeders than it has in the past.

THE ORPINGTONS.

The varieties coming out for this breed were the buff and the white. The Stokes buffs are beauties, but the cock lacked substance and was not so good in his coloring as one likes. The rest of the showing was especially fine and gave evidence that the breeder was on the right road for the proper buff color. The whites exhibited by Mr. Weedon were without doubt, the most valuable birds in the show. Crystal Prince, the blue-ribboned cock, is from the famous Kelerstrass strain and is the son of Crystal King, the highest prized bird in the world. Duchess, a daughter of Princess Louise and from the Crystal strain, is another notable bird in the Weedon exhibit. The mother of Duchess has netted her owner a small fortune and an offer of \$1,500 has been refused for her.

NEW VARIETIES.

Within the realm of poultry raising new varieties are constantly claiming attention. The new Standard of Perfection will no doubt contain many new varieties which are not now recognized by the American Poultry Association. As yet no standard is provided for the Rose-comb Rhode Island Whites and the varieties of Japanese Games. The Rhode Island Whites differ from the Reds only in having rose combs and a pure white feather. The Japanese Games are very hardy birds and in the cocks somewhat resemble the Black Sumatra in shape and color, but the females are variable in color and may be anything from a mixed buff to a black with a slight penciling of brown in the feather. The

latter color for the hen is much preferred. Other varieties of Japanese Games, which were on exhibition, were Shamo, Black Shamo and Black-Red Shamo.

THE PIGEON CLASSES.

The pigeon classes were more favorably situated this year than last year and no one exhibited a finer lot of pigeons than did Mr. J. H. Craig. He is a great admirer of the exquisite beauty which can be brought out in pigeons and took great delight in showing a large number of varieties which he is breeding. A number of boys are taking an interest in the growing of pigeons.

THE STATION'S EXHIBITS.

The Bureau of Agriculture and Forestry and the Federal Experiment Station made exhibits and distributed literature along their special lines of work to visitors. Probably the most noticeable exhibit was that on the breeding of Hibiscus flowers, which has been done by Valentine Holt, C. Montague Cooke, A. Gartley and G. P. Wilder. Cross-fertilization has produced some very pleasing forms and some very delicate shades in the color markings of the flowers.

The college would have been very happy to have had some fowls in the show this year but must wait until the houses and lots can be provided. The work of the Agricultural Colleges on the mainland is building up this one branch of animal industry in a remarkable way. So it certainly behooves every one interested in poultry raising in Hawaii to work for the growth of the College which can be their righthand helper to progress and more satisfactory results.

HAWAIIAN POULTRY ASSOCIATION PRIZE WINNERS.

With Number of Points Scored by Winning Birds.

January 12-15, 1910.

Barred Plymouth Rock, Cock. C. Montague Cooke, first, 94½; F. C. Atherton, second, 91½.

Barred Plymouth Rock, Cockerel. C. Montague Cooke, first, 94½; F. C. Atherton, second, 91½; Jas. H. Love, third, 89½.

Barred Plymouth Rock, Hen. F. C. Atherton, first, 96½; second, 95; John Guild, third, 94¼; fourth, 93¾; C. Montague Cooke, fifth, 92¼.

Barred Plymouth Rock, Pullet. F. C. Atherton, first, 93½; C. Montague Cooke, second, 92¼; F. C. Atherton, third, 91¾.

White Plymouth Rock, Cock. C. B. High, first, 97; second, 96; third, 95½.

- White Plymouth Rock, Cockerel.* C. B. High, first, 97; second, 96; third, $95\frac{3}{4}$; fourth, 95; Joseph Farrington, fifth, $94\frac{1}{4}$.
- White Plymouth Rock, Hen.* C. B. High, first, 97; second, $96\frac{1}{2}$; third, $95\frac{3}{4}$; fourth, $95\frac{1}{4}$.
- White Plymouth Rock, Pullet.* C. B. High, first, $97\frac{1}{2}$; second, $95\frac{1}{2}$; third, $94\frac{3}{4}$.
- Buff Wyandotte, Cockerel.* E. H. Brown, first, $91\frac{1}{2}$; B. F. Beardmore, second, $90\frac{1}{2}$.
- Buff Wyandotte, Cock.* B. F. Beardmore, first, 91.
- Buff Wyandotte, Hen.* B. F. Beardmore, first, $93\frac{1}{4}$.
- Buff Wyandotte, Pullet.* Geo. C. Potter, first, $96\frac{1}{4}$; second, $94\frac{1}{4}$; B. F. Beardmore, third, $92\frac{3}{4}$.
- S. C. Rhode Island Red, Cock.* E. H. Kilbey, first, $90\frac{1}{2}$.
- S. C. Rhode Island Red, Cockerel.* John Cullen, first, $96\frac{1}{2}$.
- S. C. Rhode Island Red, Pullet.* John Cullen, first, $94\frac{1}{2}$.
- R. C. Rhode Island White, Cockerel.* J. A. Johnson, first, comparison.
- R. C. Rhode Island White, Hen.* J. A. Johnson, first, comparison.
- R. C. Rhode Island White, Pen.* Jason Andrade, first, comparison; J. A. Johnson, second, comparison.
- Dark Brahma, Cock.* F. Santos, first, $94\frac{1}{2}$.
- Dark Brahma, Cockerel.* Vincent Fernandez, Jr., first, 96; F. Santos, second, 91.
- Dark Brahma, Hen.* F. Santos, first, $90\frac{1}{2}$.
- Dark Brahma, Pullet.* Vincent Fernandez, Jr., first, $95\frac{1}{2}$; second, 95; F. Santos, third, 94.
- S. C. Brown Leghorn, Cockerel.* Walter C. Weedon, first, $91\frac{3}{4}$.
- S. C. Brown Leghorn, Hen.* Walter C. Weedon, first, $97\frac{3}{4}$; second, 97.
- S. C. Brown Leghorn, Pullet.* Walter C. Weedon, first, $97\frac{1}{2}$; second, $95\frac{3}{4}$.
- S. C. Brown Leghorn, Pen.* Walter C. Weedon, first, $188\frac{3}{4}$.
- S. C. White Leghorn, Cock.* Mrs. S. I. Shaw, first, $96\frac{1}{2}$; R. C. Brown, second, 96; Walter C. Weedon, third, $94\frac{3}{4}$; Raymond C. Brown, fourth, $94\frac{1}{2}$; Mrs. S. I. Shaw, fifth, $93\frac{1}{2}$.
- S. C. White Leghorn, Cockerel.* Mrs. S. I. Shaw, first, 98; second, $97\frac{1}{2}$; third, $96\frac{1}{4}$; fourth, 95.
- S. C. White Leghorn, Hen.* Walter C. Weedon, first, $97\frac{1}{2}$; Mrs. S. I. Shaw, second, 97; Walter C. Weedon, third, $96\frac{1}{2}$; Mrs. S. I. Shaw, fourth, 96; fifth, $95\frac{1}{4}$.
- S. C. White Leghorn, Pullet.* Raymond C. Brown, first, 97; Walter C. Weedon, second, $96\frac{3}{4}$; third, $96\frac{1}{2}$; Raymond C. Brown, fourth, 96; Mrs. S. I. Shaw, fifth, $95\frac{1}{2}$.
- S. C. White Leghorn, Pen.* Mrs. S. I. Shaw, first, $92\frac{1}{4}$; second, 88; third, $82\frac{1}{4}$.
- S. C. Buff Leghorn, Cockerel.* Chas. Wagner, second, $88\frac{3}{4}$; A. N. Campbell, third, $88\frac{1}{2}$; fourth, $86\frac{1}{2}$.
- S. C. Buff Leghorn, Pullet.* Chas. Wagner, first, $89\frac{1}{2}$; second, 89; A. N. Campbell, third, 88; Chas. Wagner, fourth, $86\frac{3}{4}$.

- S. C. Black Minorca, Hen.* Walter C. Weedon, first, $90\frac{1}{4}$; J. H. Craig, second, 90; Walter C. Weedon, third, $89\frac{1}{2}$; fourth, 88; J. H. Craig, fifth, $86\frac{1}{2}$.
- S. C. Black Minorca, Pullet.* Walter C. Weedon, first, $92\frac{1}{2}$; F. C. Atherton, second, 87.
- S. C. White Minorca, Hen.* John Guild, first, 90; Walter C. Weedon, second, $89\frac{1}{2}$; third, 89; John Guild, fourth, 88; fifth, $87\frac{1}{2}$.
- S. C. White Minorca, Pullet.* Walter C. Weedon, first, $91\frac{1}{2}$; second, 90.
- Blue Audalusan, Pullet.* A. N. Campbell, first, 94; second, $93\frac{3}{4}$; third, $90\frac{1}{2}$.
- Silver-Grey Dorking, Hen.* Walter C. Weedon, Second, $88\frac{3}{4}$.
- S. C. Buff Orpington, Cock.* John F. Stokes, second, 88.
- S. C. Buff Orpington, Cockerel.* John F. Stokes, first, $90\frac{1}{2}$; second, $89\frac{1}{2}$; third, $88\frac{1}{4}$.
- S. C. Buff Orpington, Hen.* John F. Stokes, first, 92.
- S. C. Buff Orpington, Pullet.* John F. Stokes, first, 91; second, $90\frac{1}{2}$; third, $89\frac{1}{2}$.
- S. C. White Orpington, Cock.* Walter C. Weedon, first, $91\frac{1}{4}$.
- S. C. White Orpington, Cockerel.* Walter C. Weedon, second, $88\frac{3}{4}$; third, 87.
- S. C. White Orpington, Hen.* Walter C. Weedon, first, 91; second, $90\frac{3}{4}$.
- S. C. White Orpington, Pullet.* Walter C. Weedon, first, $90\frac{1}{2}$.
- S. C. White Orpington, Pen.* Walter C. Weedon, second, $174\frac{3}{4}$.
- Black-Breasted Red Game (Old English), Cock.* E. J. Gay, first, 93.
- Black-Breasted Red Game (Old English), Hen.* E. J. Gay, first, $93\frac{1}{2}$.
- Cornish Indian, Cock.* John Markham, first, 92; second, $90\frac{3}{4}$; third, $90\frac{1}{2}$; fourth, $90\frac{1}{4}$.
- Cornish Indian, Cockerel.* John Markham, first, $90\frac{1}{2}$.
- Cornish Indian, Hen.* John Markham, first, $93\frac{1}{2}$; second, $93\frac{1}{4}$; third, 93; fourth, $92\frac{1}{2}$; fifth, $89\frac{1}{2}$.
- Cornish Indian Pullet.* John Markham, first, 91; second, 90.
- Malay Game, Cockerel.* Manuel Camara, second.
- Japanese Game, Cock.* J. H. Cummings, first; Joseph Amorin, second.
- Japanese Game, Hen.* Joseph Amorin, first; J. H. Cummings, second; third.
- Japanese Game, Pullet.* Joseph Amorin, first; Manuel Camara, second; third.
- Shamo (Japanese) Game, Cock.* Harold Jeffs, first.
- Shamo (Japanese) Game, Hen.* Harold Jeffs, first; second; third; fourth; fifth.
- Black Shamo (Japanese) Game, Cock.* E. J. Gay, second.
- Black-Red Shamo (Japanese) Game, Cockerel.* E. J. Gay, first.
- Pit Game, Cock.* M. J. Scanlon, first; Geo. S. Curry, second.

Pit Aseel, Cock. S. De Freest, second.

White Holland Turkey, Cock. Mrs. E. R. Bath, first.

There were also entries in the following classes:

Buff Plymouth Rock Pen.

Partridge Wyandotte, Pen.

R. C. Rhode Island White, Pullet.

S. C. Black Minorca, Cock.

S. C. Black Minorca, Cockerel.

S. C. Black Minorca, Pen.

S. C. White Minorca, Cockerel.

S. C. White Minorca, Pen.

Blue Andalusian, Cock.

Blue Andalusian, Cockerel.

Silver-Grey Dorking, Cock.

Silkies (White Chinese), Cock.

Silkies (White Chinese), Hen.

Leghorn-Game, Cross.

Pekin Ducks.

Guinea Fowl.

PIGEON CLASS.

White Pouter, Pair. J. H. Craig, first; second.

Colored Pouter, Pair. Harold P. Hustace, first.

White Fantail, Pair. J. H. Craig, first; second.

Black Fantail, Pair. J. H. Craig, first.

Brown Fantail, Cock. Harold P. Hustace, first.

Black English Carrier, Pair. W. W. Wright, first (old); second (young).

Buff Jacobin, Pair. W. W. Wright, first; second (young).

Brown Jacobin, Cock. Harold P. Hustace, first.

Brown Jacobin, Hen. J. H. Craig, first.

Brown Jacobin, Pair. Harold P. Hustace, first.

Black Jacobin, Hen. Harold P. Hustace, first.

Brown Tumbler, Pair. J. H. Craig, first, Harold P. Hustace, second.

Brown Turbit, Cock. J. H. Craig, second.

Brown Magpie, Pair. J. H. Craig, first.

Blue Dragoon, Cock. Harold P. Hustace, first.

Light-Blue Runt, Pair. W. W. Wright, first (young).

Dark-Blue Runt, Cock. W. W. Wright, first (young).

Blue Runt, Cock. J. H. Craig, first.

Silver Runt, Hen. J. H. Craig, first.

Silver Runt, Pair. J. H. Craig, first; second.

Silver Dun Runt, Pair. W. W. Wright, second (young).

Bronze Runt, Pair. J. H. Craig, first.

Archangel, Pair. W. W. Wright, first (old).

White Maltese, Cock. J. H. Craig, first.

Blue Swallow, Cock. J. H. Craig, first.

- White Barb, Cock.* Harold P. Hustace, first (young).
White Barb, Hen. J. H. Craig, first.
Black Barb, Cock. J. H. Craig, first.
Carneaux, Cock. Thomas Rewcastle, first (young).
Carneaux, Hen. Thomas Rewcastle, first (young).
Carneaux, Pair. Thomas Rewcastle, first (young).
Yellow Carneaux, Pair. E. O. White, second.
Red Carneaux, Pair. E. O. White, first.
Black Homer, Cock. W. W. Wright, first (old); Walter C. Weedon, second (old).
Black Homer, Hen. Walter C. Weedon, first (old).
Black Homer, Pair. J. H. Craig, first.
Blue Pied Homer, Cock. Walter C. Weedon, first (old).
Light Pied Homer, Pair. Walter C. Weedon, first (young).
Chocolate Homer, Cock. Walter C. Weedon, second (old).
Chocolate Homer, Hen. Walter C. Weedon, second (old).
Blue Barred Homer, Cock. Walter C. Weedon, first (old).
Blue Barred Homer, Hen. Walter C. Weedon, first (old).
Chequered Homer, Cock. Walter C. Weedon, first (old).
Chequered Homer, Hen. Walter C. Weedon, first (old).
Silver-Blue Homer, Hen. Walter C. Weedon, first (old).
Splashed Homer, Cock. Harold P. Hustace, second.
Hen-Runt Cross, Pair. J. H. Craig, second.

In addition to the regular awards the following prizes were also given:

The American Poultry Association's Grand Prize Silver Medal for the best cockerel in the American Class, won by Dr. C. B. High; in the Asiatic Class, won by V. Fernandez, Jr.; in the Mediterranean Class, won by Mrs. S. I. Shaw; in the English Class, won by J. F. G. Stokes.

The American Poultry Association's Diploma for the best male under one year old in all standard varieties, won as follows: In Barred Plymouth Rocks, C. Montague Cooke; White Plymouth Rocks, Dr. C. B. High; Buff Wyandottes, E. Herrick-Brown; S. C. Rhode Island Reds, J. Cullen; Dark Brahmas, V. Fernandez, Jr.; S. C. Brown Leghorns, W. C. Weedon; S. C. White Leghorn, Mrs. S. I. Shaw; S. C. Buff Leghorn, Chas. Wagner; S. C. Buff Orpingtons, J. F. G. Stokes; S. C. White Orpingtons, W. C. Weedon; Cornish Indians, John Markham.

The Governor's Cup, for the largest and best exhibit of birds in the American Class, won by Dr. C. B. High.

The Mayor's Cup, for the best-colored Hawaiian-bred chicken, any variety, won by Dr. C. B. High.

The Directors' Cup, for the largest number of birds scoring ninety points or over, won by W. C. Weedon.

The Hawaiian Poultry Association's Cups were awarded as follows: For the best "collection" in the American Class, Dr. C. B. High; in the Mediterranean Class, Mrs. S. I. Shaw; in the

English Class, J. F. G. Stokes; in the Game Class, John Markham. For the best male chicken, W. C. Weedon; for the best female chicken, W. C. Weedon.

For the best exhibit of pigeons, J. H. Craig.

Mr. H. Jeffs' Cup, for the heaviest chicken, Dr. C. B. High.

Special Prize Ribbons were awarded as follows: Highest scoring Hawaiian-bred bird, Mrs. S. I. Shaw. Best pen in the American Class, J. Andrade; in the Mediterranean Class, Mrs. S. I. Shaw; in the English Class, W. C. Weedon. Best conditioned bird, Dr. C. B. High. Best shaped male in the show, Dr. C. B. High; best shaped female, Raymond C. Brown. Best parti-colored male, C. Montague Cooke; best parti-colored female, F. C. Atherton. Best solid colored male, Mrs. S. I. Shaw; best solid colored female, W. C. Weedon.

Heaviest Tom, Mrs. E. R. Bath.

Best twelve white eggs, won by Mr. John Guild; best twelve brown eggs, W. C. Weedon.

THE REPORT OF THE SECTION ON FORESTS, NATIONAL CONSERVATION COMMISSION.

Owing to the fact that only a small edition of the full report of the National Conservation Commission was published, the findings of that body have not been as widely disseminated as the importance of the subjects treated deserves. The commission was appointed by President Roosevelt in June, 1908, and submitted its report to the President in January, 1909. The full report consists of three stout volumes, which contain beside the report of the Commission itself, the reports of the Secretaries of the four sections, Water Resources, Forests, Lands, and Mineral Resources, with various contributions by experts in many lines.

The following extracts from the report of Mr. Overton W. Price, Secretary of the Section on Forests, give the gist of the conclusions and recommendations of that branch of the Commission:

WHAT FORESTS DO.

Our industries which subsist wholly or mainly upon wood pay the wages of more than 1,500,000 men and women.

Forests not only grow timber, but they hold the soil and they conserve the streams. They abate the wind and give protection from excessive heat or cold. Woodlands make for the fiber, health, and happiness of each citizen and of the nation.

The fish which live in forest waters furnish each year \$21,000,000 worth of food, and not less than half as much is furnished by the game which could not exist without the forest.

WHAT WE HAVE.

Our forests now cover 550,000,000 acres, or about one-fourth of the United States. The original forests covered not less than 850,000,000 acres.

Forests publicly owned contain one-fifth of all timber standing. Forests privately owned contain at least four-fifths of the standing timber. The timber privately owned is not only four times that publicly owned, but it is generally more valuable.

Forestry is now practiced on 70 per cent. of the forests publicly owned and on less than 1 per cent. of the forests privately owned, or on only 18 per cent. of the total area of forests.

WHAT IS PRODUCED.

The yearly growth of wood in our forests does not average more than 12 cubic feet per acre. This gives a total yearly growth of less than 7,000,000,000 cubic feet.

Nearly all our native commercial trees grow much faster than those of Europe. We already grow post timber in twenty to thirty years, mine timber in twenty-five to thirty-five years, tie timber in thirty-five to forty years, and saw timber in thirty to seventy-five years.

We have 200,000,000 acres of mature forests, in which yearly growth is balanced by decay; 250,000,000 acres partly cut over or burned over, but restocking naturally with enough young growth to produce a merchantable crop; and 100,000,000 acres cut over and burned over, upon which young growth is either wholly lacking or too scanty to make merchantable timber.

WHAT IS USED.

We take from our forests yearly, including waste in logging and in manufacture, 23,000,000,000 cubic feet of wood.

We use each year 100,000,000 cords of firewood, 40,000,000 board feet of lumber, more than 1,000,000,000 posts, poles, and fence rails, 118,000,000 hewn ties, 1,500,000,000 staves, over 133,000,000 sets of heading, nearly 500,000,000 barrel hoops, 3,000,000 cords of native pulp wood, 165,000,000 cubic feet of round mine timbers, and 1,250,000 cords of wood for distillation.

WHAT IS WASTED.

Since 1870 forest fires have each year destroyed an average of fifty lives and \$50,000,000 worth of timber. Not less than 50,000,000 acres of forest are burned over yearly. The young growth destroyed by fire is worth far more than the merchantable timber burned.

One-fourth of the standing timber is left or otherwise lost in logging. The boxing of longleaf pine for turpentine has de-

stroyed one-fifth of the forests worked. The loss in the mill is from one-third to two-thirds of the timber sawed. The loss in the mill product through seasoning and fitting for use is from one-seventh to one-fourth. Great damage is done by insects to forests and forest products. An average of only 320 feet of lumber is used for each 1,000 feet which stood in the forest.

WHERE WE STAND.

We take from our forests each year, not counting the loss by fire, three and one-half times their yearly growth. We take 40 cubic feet per acre for each 12 cubic feet grown; we take 260 cubic feet per capita, while Germany uses 37 cubic feet and France 25 cubic feet.

We invite by overtaxation the misuse of our forests. We should plant, to protect farms from wind and to make stripped or treeless lands productive, an area larger than that of Pennsylvania, Ohio, and West Virginia combined. But so far, lands successfully planted to trees make a total area smaller than Rhode Island. And year by year, through careless cutting and fires, we lower the capacity of existing forests to produce their like again, or totally destroy them.

The conditions of the world supply of timber makes us already dependent upon what we produce. We send out of our country one and one-half times as much timber as we bring in. Except for finishing woods, relatively insignificant in quantity, we must grow our own supply or go without.

WHAT SHOULD BE DONE.

We should stop forest fires. By careful logging we should both reduce waste and leave cut-over lands productive. We should make the timber logged go further by preservative treatment and by avoiding needless loss in the woods, the mill, the factory, and in use. We should plant up those lands now treeless which will be most useful under forest. We should so adjust taxation that cut-over lands can be held for a second crop. We should recognize that it costs to grow timber as well as to log and saw it.

We should continue and perfect, by State and nation, the preservation by use of forests publicly owned; and we should extend it to other mountain forests more valuable for the permanent benefit of the many than for the temporary profit of a few.

For each million acres of forest in public ownership over 4,000,000 are privately owned. The conservation of public forests is the smaller task before the nation and the States. The larger task is to induce private forest owners, which means 3,000,000 men, to take care of what they have, and to teach wood users, which means every one, how not to waste.

If these things are done, they will conserve our streams as well as our forests. If they are not done, the usefulness of our streams will decrease no less than the usefulness of our forests.

The Duty of the Private Owner.

Four-fifths of our standing timber is in private hands. The conservation of our forests and of the timber used depends mainly upon individual forest owners and users. If American citizens will protect their forests from fire, will provide by conservative logging for a good second crop, and will take every reasonable precaution against the waste of timber in the woods, in the mill, in the factory, and in use, their forests will eventually supply more than their need, continuously. If these things, each one of which will pay now and in the future as well, are not done, this nation will ultimately be dependent upon public forests. These, if cut absolutely clean, would furnish only enough lumber to meet our national need for ten years. At the end of that time they would be exhausted. If we are to be saved from great suffering for lack of timber, the forests of private owners must supply the timber.

Forest Planting.

Forest planting means the protection of denuded watersheds from erosion, and the protection of farm homes and crops from wind and cold. In many localities, it means the production of timber near by instead of bringing it from a distance at much greater cost.

The United States contains 65,000,000 acres of stripped land, suitable only for the growing of trees, which will not bear a productive forest again except through the actual planting of trees, or sowing of tree seeds. The West contains 16,000,000 acres of naturally treeless land which should be planted to trees in the interest of agriculture in the prairie region and on irrigated lands elsewhere. Thus far, we have planted in all less than 1,000,000 acres, of which probably less than one-half is successful, because we have planted, for the most part, without adequate knowledge of where, what, and how to plant.

To sum up, our task in forest planting is vast. Thus far in actual acreage successfully planted our accomplishment is wholly inadequate. The area of naturally treeless lands already planted is utterly insignificant in comparison with their total extent. Upon denuded forest lands we have planted only 1 acre to each 10,000 we have to plant.

Task of the States.

The States in their relation to the forest face these specific duties: To adjust taxes on forest lands, so that they can be held profitably for forest purposes; to pass good laws for safeguarding forest property from fire, and enforce them; to conserve state forests and extend them to cover other forest lands needed for the permanent benefit of the whole State; and to coöperate with the Federal Government in teaching the people how to take care of their forests.

State Forests.

In most States the area of forest land which will best serve the people of the States under state ownership and administration is much larger than the area now in state forests. In the extension of state forests, and in the better management of all state forest lands, the States face an immediate individual problem. Especially in the Lake States, vast areas of denuded lands, abandoned after logging destructive beyond all parallel, must be planted to trees long before they will even pay taxes.

Education.

The duty of teaching forest owners and users everywhere, how to conserve their forests, rests both with the Federal Government and with the States. The active coöperation of each State is essential. Many States present forest problems peculiar to themselves, which it is incumbent mainly upon each of them to solve. This can not be done without money, nor without trained men under a forest organization.

WHERE WE MIGHT STAND.

By reasonable thrift we can produce a constant timber supply beyond our present need, and with it conserve the usefulness of our streams for irrigation, water supply, navigation, and power.

Under right management our forests will yield four times as much as now. We can reduce waste in the woods and in the mill at least one-third, with present as well as future profit. We can perpetuate the naval-stores industry. Preservative treatment will reduce by one-fifth the quantity of timber used in the water or in the ground. We can practically stop forest fires at a total yearly cost of one-fifth the value of the standing timber burned each year.

We shall suffer for timber to meet our needs until our forests have had time to grow again. But if we act vigorously and at once we shall escape permanent timber scarcity.

INDEX—VOLUME VI.

This number of the Forester is accompanied by the title page and index for Volume VI., covering the calendar year 1909. The index has been compiled by the retiring editor, Mr. Leopold G. Blackman.

BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY.

ROUTINE REPORTS.

Division of Forestry.

Honolulu, Hawaii, January 3, 1910.

The Board of Commissioners of Agriculture and Forestry,
Honolulu, Hawaii.

Gentlemen:—I have the honor to submit the following report of the Division of Forestry for the month of December, 1909:

EUCALYPTUS INVESTIGATION.

The investigation of the planted groves of Eucalyptus in the Territory, of which mention has been made in previous reports, is now well under way. Mr. Louis Margolin, Forest Examiner in the United States Forest Service, arrived in Honolulu November 29. On December 3, Mr. Margolin and I started on a quick but comprehensive trip to Maui and Hawaii, during which we visited the principal Eucalyptus groves on these islands. We returned to Honolulu on December 14. The object of this trip was to put Mr. Margolin well in touch with the local situation before detailed work was begun in any one place.

The program of the Eucalyptus investigation, as it now stands, includes the compilation of all the available data in regard to the existing groves, the accurate measurement of a sufficient number of standing and felled trees to secure figures for tables that can be used in estimating volume and yield, and the taking of sample plots to show the height, size and yield of the trees in typical areas.

In connection with this study there have been cut in the Tantalus Forest 150 Eucalyptus trees of three species—Blue Gum (*E. globulus*), Swamp Mahogany (*E. robusta*) and Yate (*E. cornuta*). These trees were taken out in places where the forest was in need of thinning, so that the double purpose is being served of getting the figures required for this investigation and at the same time bringing the Tantalus Forest into better condition. Arrangements have been made with the Oahu Railway & Land Co. whereby these trees will be made into ties and posts. After being properly seasoned, the ties will be laid in different parts of the track, carefully marked and dated. Different methods of seasoning will be tried. The experiment as a whole should in the end yield facts of great interest, for it is the first time that the opportunity has presented itself of systematically trying out locally grown Eucalyptus.

FOREST EXTENSION.

During December 5516 trees were sent out by the Government Nursery for planting in various parts of the Territory. While this is materially less than the number distributed in November, when the Arbor Day trees were sent out, the distribution for December is, nevertheless, considerably above the average of former years. Of the trees sent out 3144 were sold and 2372 given away. Of the larger orders, the trees went to Lihue, Kauai, Spreckelsville, Maui, and to two places on the windward side of this island. Of the free trees 1000 were sent to the Waialua Road Board for roadside planting, which, under the general direction of Mr. G. H. Gere, the County engineer, has been systematically undertaken in that section. Incidentally it may be noted that the Division of Forestry furnished a number of Christmas trees to persons in and about Honolulu, among them being the tree for the so-called "Malihini" Children's Festival.

It is one of the functions of the Government Nursery to keep constantly on hand trees of the kinds in most demand for forest, windbreak and roadside planting. These trees are sold at cost price to anyone desiring to obtain them. Individuals or corporations desiring to do extensive tree planting are assisted to establish nurseries of their own, but if for any reason this is not convenient, the Division of Forestry stands ready, if given sufficient notice, to supply trees in practically any quantity. In this way it follows up its recommendations by practical support.

At the end of December there were on hand in the Nursery and at the Makiki Station 75,000 seedlings in seed boxes, transplant boxes and pots. About 30,000 are to be used in planting the water reserve in the Pupukea and Paumalu Homestead Tract. The trees are to be planted in accordance with a plan drawn up by Mr. Haughs in November. They will be sent out as soon as the Homesteaders who are to do the work are ready to receive them. It is expected that the trees will be put into the ground within the next few weeks.

There has recently been received from Japan a consignment of the seed of Japanese Cedar (*Cryptomeria japonica*), or as the Japanese call it, "Sugi." This tree has been found, by experiment, to grow well in this Territory, especially in somewhat sheltered situations between the elevations of 1000 and 4000 feet. Sample lots of this seed are being distributed to various persons throughout the Islands who have agreed to plant and care for seed of promising plants. The Division of Forestry will be glad to supply small sample lots to other persons who would like to try the Japanese Cedar. There is also now on hand for free distribution for a limited time seedling trees of the Japanese Cedar resulting from seed obtained last year. These seedlings will be given out to persons who have land suitably located for the growing of this species. The Japanese Cedar is a tree that ought generally to be planted in Hawaii at elevations where it will do well.

In Japan it is used for a great variety of purposes, much in the same way as is the Redwood in California.

AN ARBOR DAY COURTESY.

I have just been informed by Brother Matthias Newell of Hilo, who is in charge of the local distributing nursery in that city, that the trees sent out by him for Arbor Day planting to homesteaders and others in the vicinity of Hilo were carried free of charge by the Volcano Stables and Transportation Company and by the Hilo Railway Company. I wish to take this opportunity of expressing my appreciation of this courtesy, both to Mr. Wright, manager of the Volcano Stables, and to Mr. Filler, superintendent of the Hilo Railway.

RUBBER GROWERS' CONVENTION.

The third annual meeting of the Hawaiian Rubber Growers' Association was held on November 16. A number of papers were presented by managers of the plantations on Maui and other persons particularly interested in this industry. A number of these papers led to active discussion which brought out many points of interest. As showing the interest of this Board in rubber, both Mr. Ehrhorn and I made short speeches. A full account of this convention with most of the papers presented will be printed in the December issue of the Hawaiian Forester and Agriculturist.

The subject of my paper at the Rubber Growers' Convention was "Rubber and Reforestation," which I made the text for an argument for tree planting. It is the policy of the Division of Forestry to loss no legitimate opportunity to bring home to the people of this Territory the advantages which will accrue to them and to the Territory as a whole from forest work. It is for this reason that talks are given at different association meetings and that in general educational work in forestry is kept up. In line with this usage, at the request of Mr. R. O. Matheson, the editor of the Advertiser, I prepared an illustrated article on "The Function of Forestry in Hawaii," which was published in the Sunday Advertiser of December 12. The pictures from which the illustrations were made were some of those from which transparencies were prepared for exhibition at Seattle. The text of the article outlines why forest work is necessary to the welfare of this Territory.

ROUTINE WORK.

During the latter part of the month I personally have given considerable time to a rearrangement of the Board's allotment of the conservation fund and to other office work incidental to the recent reorganization of the office staff.

The Board building continues to be used at intervals by organizations carrying on allied branches of work. On the evening on

December 28, the directors of the Hawaiian Poultry Association held a meeting in the Library Room.

Very respectfully,

RALPH S. HOSMER,
Superintendent of Forestry.

Division of Entomology.

January 3, 1910.

Honorable Board of Commissioners of
Agriculture and Forestry,
Honolulu, Hawaii.

Gentlemen:—I respectfully submit my report of the work of the Division of Entomology for the month of December.

Of 31 vessels boarded we found fruits plants and vegetables on 17. These shipments received the usual rigid inspection and were disposed of in the following manner:

<i>Disposal with principal causes.</i>	<i>Lots.</i>	<i>Parcels.</i>
Passed as free from pests.....	640	14,186
Fumigated before releasing.....	13	20
Burned	11	19
Total	664	14,225

POSSIBLE PESTS INTERCEPTED.

The most important pest intercepted this month was the dreaded cane and banana borer (*Sphenophorus sordidus*), a cousin of the borer which we now have and which causes us such losses. This pest was found in a small shipment of plant from Fiji, in the roots of two banana suckers. There were also several injurious scale insects on a few of the plants and these were destroyed. We also found several land shells *Opeas* species, one snail *Ulota simularis* and a slug *Veronicella* species. From Funchal there arrived some pineapple plants badly infested with a scale (*Chrysomphalus bromeliae*) and as this pest does not exist here the plants were fumigated, and then burned. We also found two species of Mealy bugs (*Pseudococcus longispinus* and *citri*) on a *Smilax* plant, one on the foliage and one on the roots. One of the worst infested lots of oranges from Japan I have ever seen was found at the Immigration Station while searching baggage. The oranges were literally covered with *Cladosporium citri* and several species of scale insects, all were promptly destroyed.

In my last report I referred to a sending of *Aphodius* dung beetles received from Mr. A. Koebele and am pleased to report that a good colony was liberated at a suitable altitude on Hawaii.

During the month three shipments of parasites were received, one consisting of true parasites (Alysids) and three species of Histerids, which arrived in good condition and also included a small shipment of Ladybirds for Plantlice. The last were liberated in a very good place with abundant food (Orange aphis). The other shipments arrived in very bad condition, many of the boxes broken and most of the material consisting of Staphelinids and Alysids was dead. We are continuing breeding parasites on home collected material and although the process is very slow, we have hopes of being able to liberate sufficient parasites in the near future so that the principal districts suffering from the Horn-fly will each receive a colony.

The orange aphis is at present very abundant and much inquiry has reached our office. On examination we find that several of our ladybirds, *Coelophora inaequalis*, *C. pupillata* and *Platyomus livitigasta* are already at work and the pest no doubt will soon disappear.

The following report was received from Bro. M. Newell, Inspector at Hilo:

Hilo, Hawaii, Dec. 31, 1909.

Mr. E. M. Ehrhorn,
Superintendent, Entomological Inspection,
Honolulu.

Dear Mr. Ehrhorn:—The following is an account for December: There were 91 lots and 1528 parcels. Twenty cases of grapes having arrived in badly decayed condition had to be thrown away. Everything else being in good condition and free from pests was passed.

I regret very much that circumstances did not allow me to see you again on Sunday as there are many other points we could discuss. Well, some can be done in writing and others when we meet again. Received a colony of Ladybirds for *Orthesia* today and liberated them in our garden where there are good feeding grounds. If they succeed it will be easy for me to distribute them all over the district.

As we have not as yet the *Smyrna* fig around here, it will not be necessary for *Blastophaga*.

Please see that I receive official note paper.

Yours truly,

B. M. NEWELL.

Very truly yours,

EDW. M. EHRHORN,
Superintendent of Entomology.

Division of Animal Industry.

Honolulu, Hawaii, January 4, 1910.

Honorable Marston Campbell,
President and Executive Officer,
Board of Agriculture and Forestry,
Honolulu, Hawaii.

Sir:—I beg to report on the work of the Division of Animal Industry since my previous report, dated December 7.

Glanders. The Territory covered by the Inspector from December 8 is as follows:

Palolo—twice.

Nuuanu and Puunui, Kalihi—twice.

Puuloa, Moanalua, Waikiki District—three times.

Manoa Valley—three times.

Moiliili—twice.

Besides going through these districts Mr. Vanhuizen has gone through all the stables in the city. No suspicious cases have been found.

On Christmas Day the "Dix" arrived from the coast with 410 mules and 110 horses. These animals were unloaded and taken to the Quartermaster's corral until time of sailing for Manila. When the transport sailed 15 of these animals were left behind among which were 14 cases of pneumonia, 4 of which have died. These animals are under the care of the Quartermaster's veterinarian, Dr. Monsarrat.

On December 24 the steamship "Virginian" brought down an importation of cattle for Fred Carter. All of these animals are high grade stock, some short-horns, some Herefords. While in Honolulu some of them were placed at the Quarantine Station, others on Queen street, and all were thoroughly sprayed with disinfectant to prevent infection with ox-warble fly.

Since the last meeting of the Board new rules and regulations regarding the importation of live stock into the Territory have been gone over, approved and placed in the hands of the printers. The first proof will be ready to tomorrow.

The following importations of live stock have arrived at this port since December 7th:

Dec. 8, 1909—S. S. "Aorangi"—1 crate turkeys.

" 11, 1909—S. S. "Lurline"—4 head mules; 12 cts. Poultry.

" 11, 1909—S. S. "Makura"—2 dogs.

" 14, 1909—S. S. "Swanley"—2 cts. chickens, 4 head finches.

" 14, 1909—Transport "Logan"—1 dog.

" 17, 1909—S. S. Alameda"—2 dogs, 7 crates poultry, 1 crate pigeons, 2 cages white mice.

" 21, 1909—S. S. "Hilonian"—4 crates poultry.

- " 24, 1909—S. S. "Virginian"—21 head horses, 17 head cattle, 11 head goats (Angora), 3 head dogs, 1 crate geese.
- " 27, 1909—S. S. "Mongolia"—1 dog.

Very respectfully,

VICTOR A. NORGAARD,
Territorial Veterinarian.

1908 YEAR BOOK.

Following his usual custom the Hon. J. K. Kalanianaʻole, Delegate to Congress, has deposited with the Board of Agriculture and Forestry for distribution, his quota of the 1908 year book of the U. S. Department of Agriculture. As usual this volume contains much that is of interest and value to people in Hawaii. Copies will be sent free on application to the undersigned at Box 331, Honolulu.

RALPH S. HOSMER,
Superintendent of Forestry.

FARMERS' BULLETINS.

Hog Cholera. By M. Dorset, Chief, Biochemic Division, Bureau of Animal Industry. Pp. 25, figs. 3. (Farmers' Bulletin 379.)

This bulletin is intended to supersede Farmers' Bulletin 24 on the same subject, and contains information as to the cause and symptoms of hog cholera, describes diseases which may be mistaken for hog cholera, and gives directions for the prevention and treatment of the disease by the use of serum.

Experiment Station Work, LIV. (Compiled from the publications of the agricultural experiment stations.) Pp. 32, figs. 9. (Farmers' Bulletin 381.)

Contents: Methods and cost of clearing land; Tobacco improvement work; Calf feeding; Gasoline-heated colony brooders; Measuring acidity in cheese making and butter making.

The Adulteration of Forage-plant Seeds. By F. H. Hillman, Assistant Botanist, Seed Laboratory, Bureau of Plant Industry. Pp. 23, figs. 19. (Farmers' Bulletin 382.)

This Bulletin explains the nature and forms of adulteration of seeds, the results of such adulteration, and describes the kinds of forage-plant seeds commonly adulterated and the seeds used as adulterants.

THE PUNA LUMBERING CONTRACT.

On January 5, 1910, the Commissioner of Public Lands sold at public auction in Honolulu the right to lumber a tract of government land in the District of Puna, Island of Hawaii. As a matter of general interest the contract under which the work is to be done is herewith published in full. It is a carefully drawn instrument that has received much thought from government officials during the past year. It should be noted that the contract contains a number of provisions designed to insure the carrying out of the logging in accordance with the best usages of forestry and to safeguard the interests of the government on the portion of land that is to remain permanently under forest cover. Especial attention is called to the provisions relating to the protection of the forest against fire, the removal of tops and other slashings should that prove necessary because of fire or insect risk, and to fencing. It is equally in the interest of the government and of the lumber company that there be as little waste as possible. Consequently a number of provisions are included that deal with this phase of the question.

In this connection it seems appropriate at this time to make public the report of the Superintendent of Forestry in regard to the general problem presented to the Territorial Government by the application for logging rights in the District of Puna. Mr. Hosmer's report goes somewhat exhaustively into the matter, outlining the facts of the case and making specific recommendations.

These documents are as follows:

THE LOGGING CONTRACT.

THIS INDENTURE, made this 5th day of January, 1910, by and between MARSTON CAMPBELL, Commissioner of Public Lands of the Territory of Hawaii, hereinafter called the "LICENSOR," and the HAWAIIAN DEVELOPMENT COMPANY, LIMITED, hereinafter called the "LICENSEE,"

WITNESSETH:

THAT WHEREAS, the Licensor did duly advertise for sale at public auction, at the front door of the Capitol in Honolulu, in said Territory, on the 5th day of January, 1910, a license to cut and remove timber being or growing upon the lands hereinafter described;

AND WHEREAS, at the time and place aforesaid the said license was duly sold at auction to the Licensee, it then and there being the highest and best bidder for said license;

NOW THEREFORE, in consideration of the premises and of the covenants and agreements of the Licensee, and subject to the

terms and conditions, hereinafter contained, the Licensor doth hereby grant to the Licensee a license, right, privilege and authority as follows:

CHARACTER AND LOCATION. To cut and remove the merchantable timber, except as hereinafter provided, now standing or being on the public lands below described, to-wit:

The lands situate in the District of Puna, Island and Territory of Hawaii, designated in general on the maps of the Territorial Survey Department as "Kaohe," and including not only the individual land of Kaohe, but other government lands in said District lying Northerly from Kaohe, and within the following boundaries, viz:

Bounded on the East and Southeast by the lands of Waiakahiula, Keahialaka and the open pahoe country lying mauka of the Kamaili Homesteads, the Kaimu Homesteads and the Hill known as Heiheiahulu, as far as the land of Kahaualea; on the South by the said land of Kahaualea, and on the North and West by the land of Keaau, excluding the unsold portions of the so-called "Kaohe Homesteads," which are already under lumbering license to the Hawaiian Development Company, Limited.

AREA. And estimated to contain an area of forest fit for lumbering of twelve thousand (12,000) acres, more or less.

TERM. The term within which said timber may be cut and removed from said land shall be ten (10) years, beginning with the 1st day of January, 1910.

Provided, that this license may be terminated at the option of the Licensor at any time after the expiration of the first five years of the said term upon his having given three months written notice of intention to do so.

ORDER OF WORK. The area from which timber may be cut or removed shall be laid out by the Licensee with the approval of the Licensor in blocks of approximately from three to five hundred acres, each sufficient to meet the requirements of the Licensee from time to time as accurately as reasonably may be on the map, and if necessary on the ground, in advance of cutting or removing. Cutting and removing of timber shall be done consecutively in such blocks in the order approved by the Licensor.

No more timber than reasonably necessary for the proper conduct of the business shall be cut on any block before work is completed on the next prior block. When work is completed on a given block the Licensee shall not operate again on such block and the same shall cease to be subject to the operation of the license, except as to the hereinafter mentioned incidental rights and uses for roads, sites for camps, and other purposes.

The areas for which the license fee shall be paid from time to time shall be the entire areas of the blocks operated upon whether timber is cut or removed from the whole of such block or not, except such areas therein as may be withdrawn by the Licensor

under the terms hereof, or which does not contain sufficient merchantable timber to warrant lumbering. All surveys required hereunder shall be furnished by the Licensee subject to checking by the Territorial Surveyor.

LICENSE FEE. The Licensee shall pay to the Licensor in advance upon the first day of January, 1910, and on the same day annually thereafter during the term of this license, the sum of Twenty-five Hundred (\$2,500.00) Dollars, being the license fee for an area of five hundred (500) acres, the minimum area to be paid for annually under this license at the rate of Five (\$5.00) Dollars per acre, and shall pay in addition thereto at the end of each year during said term the sum of Five (\$5.00) Dollars per acre for each acre in excess of five hundred (500) acres included in the block or blocks on which operations shall have been completed during such year and for this purpose operations shall be deemed to have been completed on any block when operations shall have begun on the next block.

RIGHTS-OF-WAY AND OTHER USE OF LAND INCIDENTAL TO LICENSE. The Licensee shall have incidental to this license and without further or other charge than that herein set forth, the use of rights-of-way for roads, cables and railroads and sites for buildings, camps, reservoirs, water pipes and other apparatus and appurtenances with, or by means of which, the business under this license shall be conducted, on all of the lands covered by this license necessary or proper to said purpose, subject to the approval of the Licensor, or to location and reasonable area.

RESERVATIONS. The Licensor shall have the right to take and withdraw from the operation of this license at any time or times the whole or any part of said land for purposes of homesteading or settlement, or such parts thereof as in the opinion of the Licensor may be necessary for forest reseedling purposes, upon written notice of intention so to take or withdraw;

BUT the Licensee may remove from the land so taken or withdrawn, or to be taken or withdrawn, all timber already cut by it prior to the receipt of such notice.

PRODUCTS EXCEPTED. The Licensee shall not, without the written consent of the Licensor, cut or remove from the area covered by this license any growing timber or other growth except trees at least eight inches in diameter, measured four and a half feet above the ground; and nothing herein contained shall be construed to prevent the Licensor or others authorized by him from taking and removing any products, other than timber hereby permitted to be taken by the Licensee from the lands covered hereby, or from making any use of such lands, not inconsistent with the exercise by the Licensee of the rights hereby granted to it.

DISPOSITION OF TOPS AND OTHER WASTE. If waste from the timber cut shall accumulate in such quantities or

be of such character as to constitute a substantial fire or insect risk, the Licensee shall upon the demand of the Licensor dispose of such waste in such manner as to avoid or remove such fire or insect risk to the satisfaction of Licensor.

FOREST FIRES. The Licensee shall use all reasonable means to prevent fires in the forest, including the use of efficient spark arresters on its locomotives and donkey and traction engines, should this be deemed necessary by the Licensor; shall prevent smoking in the woods by the laborers during times of fire danger and shall enforce whatever other special regulations in regard to fire protection may be deemed necessary by the Licensor.

In case of a fire starting in the forest, from any cause whatsoever, within the boundaries of the area covered by this license, or on other land sufficiently near thereto so that it would be liable to spread to the same, the Licensee shall, at its own expense, turn out so many or all of its employees as may be necessary and have them fight the fire until it is completely extinguished.

RAILROAD BED. The Licensee shall construct through the said forest as far as it may proceed with lumbering hereunder, a good and substantial railroad bed, on a grade and location approved by Licensor; the character of the construction of said road-bed to be such that it will be available for use as a railroad grade after the termination of said license.

PROTECTION OF FOREST GROWTH. The forest growth on areas within the area covered by this license, upon which for any reason the Licensee deems it inexpedient to, or does not, cut or remove timber, or which are reserved or excepted for seed or other purposes, as herein provided, shall be protected by the Licensee from injury. All merchantable timber cut shall be removed.

NO UNNECESSARY DAMAGE. No unnecessary damage shall be done to young growth or to trees left standing; but this shall not be construed to prevent the Licensee from using engines and cables in removing timber and firewood from the said lands, in the manner now customary in said District of Puna.

INSPECTION. The execution of the terms of this license, more particularly in respect to the lumbering to be carried on thereunder by the Licensee, shall be under the general control of the Licensor, who may have an Inspector on the work to see that the cutting and removing is carried on in conformity with this license, to be the local representative of the Licensor and in general to look after the interest of the Territory. Any expenses incident to such inspection, other than salary, shall be borne by the Licensee.

The Licensee shall provide suitable accommodations and board in its camps for the Inspector and for such other agents of the

Licensor as may have occasion to visit the area covered by this license on official business.

The Territorial Forester or other official succeeding to his powers and duties, and his agents, shall at all times, have access to the lands covered by this license, with the right to make measurements of standing and down trees and logs and to collect such other data for scientific or other use as may be desired; it being understood that this shall not be done in a way to interfere with the logging.

FOREST RESERVE. Nothing in this license shall prevent the proper authority at any time from setting aside as a Forest Reserve any portion or portions of the lands covered by this license.

FOREST FENCES. In any case where the operations of the Licensee shall make the land or any part thereof covered by this license liable to trespass of cattle, and such land shall have been, or shall, during the life of this license, be reserved, taken or withdrawn for forestry or reseeded purposes, the Licensee shall, upon the written order of the Licensor, build and maintain such fences as may be necessary to exclude cattle from such forest reserves. The Licensee may use timber growing on said land for such purpose.

RIGHT TO CANCEL LICENSE. If at any time the Licensee shall violate or fail to perform or observe any of the terms, covenants or conditions herein contained on its part to be performed or observed, the Licensor may, upon thirty days' written notice, if the Licensee has not remedied such failure or default, cancel this license, and remove the Licensee and its effects from the said premises, with or without legal process.

No right, authority or license granted herein shall be assigned or in any manner transferred for the whole or any part of said terms without the written consent of the Licensor.

The terms, covenants and conditions hereof shall be binding upon and in favor of the Licensor and those succeeding to his powers and duties and the Licensee and its permitted assigns or transferees, respectively, as the case may be.

IN WITNESS WHEREOF the Licensor has hereunto set his hand and the Licensee has caused these presents to be executed on its behalf by its officers thereunto duly authorized the day and year first above written.

MARSTON CAMPBELL,
Commissioner of Public Lands.
HAWAIIAN DEVELOPMENT CO., LTD.

(Seal)

BY L. A. THURSTON,
Its President.

BY F. B. MCSTOCKER,
Its Treasurer.

TERRITORY OF HAWAII,
CITY AND COUNTY OF HONOLULU. } ss.

On this 13th day of January, A. D. 1910, before me personally appeared MARSTON CAMPBELL, Commissioner of Public Lands of the Territory of Hawaii, to me known to be the person who executed the foregoing instrument in behalf of the Territory of Hawaii, and acknowledged that he executed the same as the free act and deed of the said Territory of Hawaii.

S. K. KAMAIOPIILI,
Notary Public,
First Judicial Circuit.

TERRITORY OF HAWAII,
CITY AND COUNTY OF HONOLULU. } ss.

On this 11th day of January, A. D. 1910, before me appeared L. A. THURSTON and F. B. McSTOCKER, to me personally known, who, being by me duly sworn, did say that they are the PRESIDENT and TREASURER, respectively, of the HAWAIIAN DEVELOPMENT CO., LIMITED, the corporation described in the foregoing instrument, and that the seal affixed to said instrument is the corporate seal of said corporation, and that said instrument was signed and sealed in behalf of said corporation by authority of its Board of Directors, and said L. A. THURSTON and F. B. McSTOCKER acknowledged said instrument to be the free act and deed of said corporation.

(Seal) WALTER C. WEEDON,
Notary Public,
First Judicial District,
Territory of Hawaii.

Report of Superintendent of Forestry.

Honolulu, Hawaii, June 1, 1909.

Board of Commissioners of
Agriculture and Forestry,
Honolulu, Hawaii.

Gentlemen:—I have the honor to submit a report with recommendations on the utilization and proper treatment of certain forest lands belonging to the Territory, in the District of Puna, Island of Hawaii.

The question at issue is whether the Territorial government shall grant the right to lumber the forests on these lands, which naturally involves the problem of the use to which the lands shall subsequently be put. The matter comes up at this time because an application for the rights to log the forest has been received from the Hawaiian Development Company, the successors of the Hawaiian Mahogany Lumber Company.

The present report contains a statement of facts and my conclusions in the premises, based thereon. My recommendations are made with the full understanding that the action taken in this case will necessarily serve as a precedent that will influence future action. For beyond the actual case in hand the present decision will serve as an expression of the policy of the Territory in regard to what is considered the wise use of one of the two main forest classes in Hawaii, the "commercial forest" as differentiated from the "water-bearing forest." The object of this report is to make clear the several aspects of the question.

DESCRIPTION OF THE TRACT.

Location and Area.

The area covered by this report is the section of unsurveyed government land lying mauka and to the west of the village of Pahoa in Puna, Hawaii, above the main government road from Olaa, known in general as "Kaohe, Government." More exactly, it is the tract bounded on the east and southeast by the privately owned lands of Waiakahiula (Catholic Mission) and Keahialaka (Bishop Estate) and the open pahoe-hoe country lying mauka of the Kamaili and the Kaimu Homesteads and the hill known as Heihei-hulu; as far as the land of Kahaualea (Campbell Estate); on the south by the land of Kahaualea; and on the north and west by the land of Keaau (Mr. W. H. Shipman), altogether an area of approximately 23,850 acres.

The application of the Hawaiian Development Company is for the stumpage rights on some 12,000 acres within this tract that are covered by merchantable forest, together with the right to log the remaining lots in the Kaohe Homesteads that have not been sold and taken up, and of which the title still vests in the government, some 500 acres more.

The commercially valuable forest extends in a northwesterly direction from the Kaohe Homesteads in a belt approximately 7 miles in length, by $2\frac{1}{2}$ miles in width. This area is flanked on either side by stretches of scrubby forest growth of no commercial value and open fields of pahoe-hoe lava covered with a scant growth of low shrubs, grass and bracken. In the stretch of open lands between the commercially valuable forest and the boundary of Keaau are a series of islands or kepukas of varying size with deep soil and a good growth of forest trees. Some of these

kepukas contain stands of Ohia of excellent size, shape and quality. As yet this country has been only very imperfectly explored. Whether or not these groups of good trees have a market value depends largely on the size of the kepukas in which they occur, for unless there is a considerable quantity of wood to be got off it would not pay to build the long road necessary to get to them. The chief interest in the tract centers therefore, in the block of forest extending mauka from the Kaohe Homesteads.

The commercial forest extends beyond and mauka of the government lands onto the privately owned tracts of Waiakahiula and Keahialaka. It is on these lands and on the Kaohe Homesteads of which title has already passed from the government to private owners, that the lumber company is now operating. All the area on these lands that is cut over is to be put into sugar cane. Both of the large lands named and most of the privately owned homesteads are now controlled by the Puna Sugar Company, at present a department of the Olaa Sugar Company.

Until recently the forest on Kaohe has been unexplored. Within the last year, since the Development Company has become interested in the project, the forest has been opened up to some extent by trails that have been cut at the expense of that company. The main trail was cut through the center of the merchantable forest belt for a distance of about five miles, with laterals running off from it at intervals. The cost of making these trails, which amounted altogether to about \$1,000, was borne by the Lumber Company. Unless trails have previously been cut through the dense undergrowth it is impracticable to travel in the Puna forest.

In September and again in December, 1908, I visited Puna and in company with representatives of the Lumber Company and with Mr. George H. Williams of Hilo, the local Land Agent, saw as much as was possible of the forest from these trails. The existing knowledge of the forest and of the character of the land itself, rests on this necessarily imperfect reconnoissance. But it is believed that sufficient information is at hand to justify the government in taking action.

The Forest.

On the homestead lots and the portion of the upper lands for which application is made, the forest consists of a practically pure stand of Ohia Lehua, of approximately even age, and of such size and height as to be of merchantable value. The trees run from 40 to 70 feet in height and from 12 to 30 inches in diameter breast high, the average diameter being roughly about 16 inches. There are, of course, some trees of other species, such as Kopiko, Ohe, Loulu Palm, etc., but they are only scattering in number and of minor importance. In portions of the forest tree ferns are present in considerable number and with the low growing shrubs, ferns and bracken make a dense undergrowth. There

is also much Ic-ic vine on the trees and in places, especially at the edge of the forest, tangles of Uluhi or Staghorn fern. There is a noticeable absence of young Ohia trees, the forest being composed, as has been said, of a practically even aged stand, of mature trees, moderately regular in size.

The forest on the tract is mature and from a silvicultural standpoint ready to be harvested. With our present lack of exact knowledge in regard to the forest it is perhaps not safe to say that it is deteriorating in quality, but from the fact that of the trees that have so far been cut on the adjoining lands, a large percentage is effected by heart rot and other defects, it is fair to assume that the conditions will not improve to any marked extent within the next few years. A virgin forest may hold its own; it cannot be expected to improve in quality.

Soil Conditions.

The reconnaissance of the forest gave information in regard to the character of the land as well as of the forest cover. From the information at hand it would appear that the remaining Kaohe homesteads are equal in character and depth of soil to those that have already been taken up and that are now being cleared to be planted in cane, and further, that the lower section of the government land mauka of the homesteads, is also to be classed as "agricultural," in that while the soil is not deep and is underlaid by pahoehoe it is yet sufficient to justify its being used to raise cane. Just where the division occurs between the arable and the non-arable land cannot now be said. It must wait a more exact knowledge of the section, but it seems to be safe to assume that from one-third to one-half of the area covered by the commercially valuable forest could ultimately be used for agriculture.

With the relatively small area of land suitable for agriculture in the possession of the Territory on the Island of Hawaii it is the policy of the administration to make available for use such areas as do exist and are possible of development. In the present instance as the result of lumbering operations a considerable area of good land would be made available while at the same time the government would benefit by a cash return from an otherwise unproductive asset.

HAWAII'S FOREST POLICY.

At this point it may be well for a moment to consider the relation that this Puna problem bears to the general forest policy of the Territory. During the past three years I have repeatedly pointed out that in Hawaii there are two main classes of forest, (1) the "water-bearing" protection forest that covers the watersheds and drainage basins of the important streams throughout the Territory, and (2) the "commercial forest" in the districts

where stream protection is unnecessary. The water-bearing forest is far and away the most important both in area and in economic value. Under our sub-tropical conditions, with heavy precipitation and with our steep, short watersheds a forest cover permanently maintained is an absolutely essential need in providing an assured supply of water for irrigation, for power development and for other economic uses. Over by far the greater part of the forest areas of the Territory the forest problems are those of water conservation, pure and simple, for where there is water to be protected the value of our local forest rests first, foremost and all the time on the influence it exerts as a protective cover. For this reason it is right and proper that the forest cover in the water-bearing forests be kept intact and that these forests be permanently maintained, strictly as protection forests.

But this in no way interferes with the fact that the other main class—the “commercial forest”—may properly be managed in a quite different way. The areas termed “commercial forest” are found in those districts where because of their recent geological formation there are not and cannot be permanently running streams. Here the value of the forest rests in the wood and timber it can produce. The forests in the District of Puna are typically and essentially of the commercial class. In that district rock and soil are incredibly porous. There simply are no streams to protect. Consequently there is no good reason why when the right time comes, the government should not apply its policy of putting the forest to use; in this case by making it yield wood and timber. The question to be decided now is whether or not the present is the right time at which to put this policy into operation.

One other point of importance is to be considered here, the possible influence of the Puna forest on the local climate. From its position Puna is naturally a district enjoying considerable precipitation, sufficient at any rate for the production of sugar cane without irrigation. But lest the objection be raised that the cutting off of 10,000 to 12,000 acres of forest would affect the rainfall, I desire to go on record that whatever may be true elsewhere in the Territory (and I have previously stated my position at length* in regard to this matter), in my judgment the influence on the rainfall of the district exerted by that portion of the Puna forest which it is proposed to cut is not of sufficient practical importance to need to be considered.

CONCLUSIONS AND RECOMMENDATIONS.

The general policy of the Territorial Government in regard to the utilization of the forests of the commercial class has been set

* Especially in an article entitled, “The Forest Situation in Hamakua,” that appears in the issue of this magazine for April, 1908; Vol. V. No. 4, pp. 77 to 89.

forth clearly at a number of different times. The Puna forest is *par excellence* a commercial forest. The question at issue is whether the present is the right time at which to put the policy of utilization into practice.

This question has for many months had my most careful thought. My conclusion is that it is right to cut and that the interests of the Territory will be better served if the rights to lumber this tract are sold now rather than that if work is delayed until some future time, in the hope of then securing somewhat more favorable terms.

My reasons for this conclusion are that the forest on this government land is mature and ready to be cut; that while it might not deteriorate in quality during, say the next decade, it cannot be expected to improve; that the government may reasonably expect to obtain as favorable terms for its lumber now as at any time in the near future; and that a considerable part of the land proposed to be cut over, being justly to be regarded as agricultural in character, it is right that it should be developed and put to use.

If this area of agricultural land is made available it will serve both as an added source of revenue to the Territory and also ultimately, for the purpose of settlement and home making. It is proposed as one of the terms of the logging contract that the Licensee shall make this land available for settlement through the construction of a road bed for a railroad, thus bringing the area into easy communication with Hilo. The need in Hawaii is for additional areas of agricultural land. This seems a way in which to help meet the demand.

I think it is obvious that where the Territorial Government has agricultural land capable of development, the requisite steps should be taken to make that area available. It is true that in the present instance there is little exact information in regard to the tract, but I believe it is fair to assume that a considerable part of the land proposed to be cut over can be used for agriculture. This being so I believe the government is justified in seeking to obtain returns from an otherwise unproductive asset while at the same time fulfilling its policy of putting all its land to its highest possible use.

For these reasons and provided it appears that a suitable price can be secured at public auction for the stumpage rights on these lands, I approve the proposal to lumber the Kaohe forest, both the homestead lots and the mauka lands and accordingly I recommend that the Board give its sanction to the project.

I further recommend that the non-arable area be set apart as soon as may be as a forest reserve and the money derived from the sale of the stumpage on that area held, as the forest law provides, as a special fund to be used for forest work. If this is done I believe the interests of the Territory will be better served

than if the forest now in Puna is held indenitely as an unproductive asset.

To put into practice the principle here set forth a form of contract has been drawn up that meets the ideas of the applicant and is legally satisfactory to the administration. This contract contains a number of forest provisions looking to the more complete utilization of the trees cut, the protection of the forest and the reforestation of the area to be retained under a forest cover. A copy of this contract is submitted herewith, but special attention may be called to the clauses relating to protection from forest fire, systematic work, disposition of tops and other waste, protection of the remaining forest growth, inspection, and the right to modify the license fee during the second half of the term of the license.

Very respectfully,

RALPH S. HOSMER,
Superintendent of Forestry.

THE NATIONAL CONSERVATION ASSOCIATION.

For some time past there has been felt the need of a popular organization which should enable individuals to unite in an effective way in furthering what have come to be known as the policies of Conservation. That need has now been met by the creation of the National Conservation Association, under the presidency of Dr. Charles W. Eliot, until recently President of Harvard University. In a recently issued circular the reasons for the formation of this new society and a statement of its purposes are given as follows:

NATIONAL CONSERVATION ASSOCIATION.

WHAT IT IS.

“Since the Governors’ Conference at the White House in May, 1908, conservation sentiment has steadily grown into a national demand. To-day there is no section of the United States which it does not reach. It has become a deep-seated conviction of the people.

“The National Conservation Association believes that this public sentiment, to be effective, must be concentrated upon specific measures and organized permanently for energetic and persistent work.

“To this end the National Conservation Association has been formed. It makes its appeal directly to the people. It is organized upon the basis of individual membership, thus affording opportunity for every citizen to share in the constructive work through which the Association proposes to coöperate with government officials and voluntary associations.

“The Governors of the States have appointed forty-two Conservation Commissions; the presidents of fifty-one great national organiza-

tions have appointed Conservation Committees. The National Conservation Association, through its popular membership, will serve as a medium to bring the work of these Commissions and Committees to the attention of the people and to bring the support of the people to their work.

"There exist several useful associations which have given special attention to particular phases of Conservation, or to Conservation in particular portions of the country. There are also several leagues interested in the promotion of Conservation, the members of which are societies and clubs. The National Conservation Association treats of the natural resources as a whole, and offers its membership to the individual citizen. The Association seeks to coöperate in all appropriate ways with existing organizations and to coördinate their work.

"The Association is organizing State Committees. Its national headquarters are in New York City. It also has offices in Washington. By bulletins and otherwise, members will be kept well informed of the work of the Association and will be called upon to render direct personal service as occasion arises."

Another circular, after rehearsing the Declaration of the Governors, which is taken as the key note of the Association, states that the purpose of the Association is "to advocate and support the adoption by the people themselves and by their representatives of definite and practical measures to carry such principles into effect, and to oppose in all appropriate ways all action which is in conflict with these principles, whether such action is attempted by individual citizens or by legislative or administrative officials. Among such measures are the following:

FORESTS.

"The protection of the source waters of navigable streams, through the purchase or control by the Nation of the necessary land within their drainage basins, especially in the Southern Appalachians and the White Mountains.

"The enactment and enforcement, both by the Nation and by the several States, of effective laws to prevent, by active patrol during dry weather, and by other appropriate means, the spreading of fire in all forests, whether publicly or privately owned.

"The reasonable but effective public regulation of timber cutting on forest land, whether publicly or privately owned, the conservation of which is essential to the public welfare.

"The separation, for purposes of taxation, of the timber from the land on which it grows, so that the forest crop shall be taxed only when it is harvested, while the land shall be taxed every year.,

"The support and extension of practical forestry.

WATERS.

"The preparation, by a Commission appointed by the President of the United States, of a comprehensive plan for waterway improvement, extending to all the uses of the waters and the benefits to be derived from their control, including navigation, with the relation of railroads and terminals thereto, the development and disposition of water power, the irrigation of arid lands, the drainage of swamp and overflowed lands, the control of floods, the prevention of soil-wash, and the purification of streams for water supply.

"The immediate undertaking and continuous prosecution of works clearly necessary under such general plan.

"The incorporation into all future grants of water-power rights by State or Nation of provisions to secure the following:

"(a) Prompt development, on pain of forfeiture of the grant.

"(b) Payment of reasonable compensation for the benefits granted by the people, with periodic readjustment of the rate of compensation,

so as to insure justice both to the investor and to the public.

“(c) The limitation of all such grants to periods not exceeding fifty years, and the reservation of the right to terminate and acquire or reconvey the grant for proper cause and upon equitable compensation; together with proper inspection and publicity of records and accounts.

“(d) Recognition of the right of the appropriate public authorities to make reasonable regulations as to rates of service.

“The termination of all existing permits or grants for the development of water power and the substitution of new grants involving the foregoing principles as soon and to such extent as may be consistent with the terms of the existing grants.

“The support and extension of the irrigation of arid lands and the drainage of swamp and overflowed lands.

LANDS.

“The directing of public attention to the need for preserving the fertility of our soils, and thus protecting the future food supply of our people.

“The enactment of legislation whereby the title to the surface of public lands and to the minerals therein shall be granted separately, with every appropriate facility to miners to acquire such part of the surface as may be needed in the development of their claims.

“The conservation and control of the unappropriated public range lands by the Government in the interests of the stockman and homemaker, and subject at all times to homestead entry.

MINERALS.

“The retention by the Government of the title to all lands still in public ownership which contain phosphate rock, coal, oil, or natural gas, and the development of the same by private enterprise, under conditions that will prevent extortion and waste.

“The enactment of appropriate legislation to prolong our coal supply, to reduce waste in mining, and to establish sufficient safeguards against the loss of life in mines.

“We desire to further all legislation which is wisely designed to diminish sickness, prevent accidents and premature death, and increase the comfort and joy of American life, believing that human efficiency, health and happiness are natural resources quite as important as forests, waters, lands and minerals.”

This platform is one that should appeal to every one who believes in the principles of Conservation and who wishes to see them put into practical effect. Membership in the National Conservation Association is divided into a number of classes as follows:

Members—Persons contributing annually.....	\$ 2.00
Active Members—Persons contributing annually.....	5.00
Contributing Members—Persons contributing annually.....	25.00
Patrons—Persons contributing annually.....	100.00
Life Members—Persons contributing.....	1,000.00

Applications for membership, accompanied by checks made payable to John F. Bass, Treasurer, may be sent to the general office of the Association, 1170, The Fifth Avenue Building, New York City.

For the convenience of persons in the Territory of Hawaii the Superintendent of Forestry will be glad to receive and forward

applications for membership, when accompanied by the dues required for the class in which membership is desired. Local checks should be made payable to Ralph S. Hosmer, letters should be addressed Box 331, Honolulu, Hawaii.

Recent developments have made it evident that now is the time for those who believe in Conservation to stand together. In no way can individuals help better than by uniting for effective work in this Association. "Let us conserve the foundations of our prosperity."

PROPOSED DOG SHOW.

The following article from the *Pacific Commercial Advertiser* of January 27, 1910, is believed to be of sufficient general interest to warrant its being reprinted here:

The Kennel Club had a very well attended and enthusiastic meeting in Tom Sharp's paint foundry last evening, and not only elected new officers, but definitely decided to have a dog show in Honolulu during September while the Alameda is here.

The officers elected are: D. P. R. Isenberg, president; L. C. Ables, vice-president; Tom Sharp, secretary and treasurer; W. J. White, auditor; D. P. R. Isenberg, Tom Sharp, W. H. Charlock, Wm. Henry, Doctor Rowat, J. McVeigh and C. T. Littlejohn, directors.

The matter of a judge was brought up and Tom Sharp stated that the services of the well known judge and expert, George Cranfield, of Fruitvale, California, would be at the disposal of the club. Mr. Cranfield will be able to leave on the Alameda and take the same boat back after the show is over.

During the informal discussion a very interesting fact, that is not generally known, came up. That is that dogs, with a pedigree certified to by a secretary of a kennel club, are admitted to the United States free of any duty. Without this open sesame a dog is valued and twenty per cent. of the valuation charged.

The last show given by the local kennel club was in September, 1907. At this show there were some 150 dogs exhibited and the affair was a great success. This year the club hopes to have just as large an entry list and with dogs of much higher rating entered in all classes.

There was some talk about the possibility of making the dog show a regular agricultural fair, with a horse show, cattle show, chicken show and fruit and vegetable show. But, while this was taken as an excellent idea it was thought that, as most of the stock would have to come from the other islands, it would be hardly practicable. The sending of valuable stock by steamers from one island to another and back, is hardly a suggestion that would appeal to owners.

60 YEARS'
EXPERIENCE

PATENTS

TRADE MARKS
DESIGNS
COPYRIGHTS &C.

Anyone sending a sketch and description may quickly ascertain our opinion free whether an invention is probably patentable. Communications strictly confidential. HANDBOOK on Patents sent free. Oldest agency for securing patents. Patents taken through Munn & Co. receive special notice, without charge, in the

Scientific American.

A handsomely illustrated weekly. Largest circulation of any scientific journal. Terms, \$3 a year; four months, \$1. Sold by all newsdealers.

MUNN & Co. 361 Broadway, New York
Branch Office, 625 F St., Washington, D. C.

Garden and Farm Tools and Implements

To do good farming you must have up to date tools to work with. We carry a most complete line of everything needed by the small or large farmer, from the smallest hand trowel to the largest cane plow. We also have a good assortment of Hand, Bucket or Barrel Sprayers. Our assortment of Hoes, Shovels, Spades, Mattocks, Rakes, Garden Shears, Lawn Mowers, Garden Hose, and other things that are needed daily about the farm or garden, is most complete and our stock large.

E. O. HALL & SON, LTD.

Office: Brewer Building, Queen St.
Works Iwilei,

Telephone 430.
Telephone 272.

The Hawaiian Fertilizer Co., Ltd.

HONOLULU, HAWAII.

MANUFACTURE AND DEAL IN ALL KINDS OF
Fertilizer and Fertilizer Ingredients

INCLUDING :

Bone Meal,	Sulfate Ammonia,
Nitrate Soda,	Sulfate Potash,
Double-Superphosphate,	Dissolved Guano,
Ground Limestone, etc., etc.	

BOARD OF DIRECTORS :

Chas. M. Cooke, President,	E. F. Bishop, Treasurer,
E. D. Tenney, Vice-President,	J. Waterhouse, Secretary,
Geo. H. Robertson, Auditor,	
W. M. Alexander	
C. H. Atherton,	
E. F. Bishop, Managing Director,	
Norman Watins, General Superintendent	

The products of this company are equal in every respect to any fertilizers sold in any market. In none of the conditions are they ranked by those manufactured elsewhere.

We will be pleased to furnish analysis of the soil of any locality in the Territory and make special fertilizers for different soil products arranging the composition to suit conditions.

Prices and Terms on Application.

Board of Agriculture and Forestry.

PUBLICATIONS FOR DISTRIBUTION.

Any one or all of the publications listed below (except those marked *) will be sent to residents of this Territory, free, upon application to Mailing Clerk, P. O. Box 331, Honolulu.

BOARD.

- Report of the Commissioner of Agriculture and Forestry for 1900; 66 pp.
Report of the Commissioner of Agriculture and Forestry for 1902; 88 pp.
* First Report of the Board of Commissioners of Agriculture and Forestry, from July 1, 1903, to December 31, 1904; 170 pp.
Second Report of the Board of Commissioners of Agriculture and Forestry, for the year ending December 31, 1905; 240 pp.; 8 plates; 10 text figures.
Third Report of the Board of Commissioners of Agriculture and Forestry, for the year ending December 31, 1906; 212 pp.; 3 plates; 4 maps; 7 text figures.
Fourth Report of the Board of Commissioners of Agriculture and Forestry, for the calendar year ending December 31, 1907; 202 pp.; 7 plates.
Fifth Report of the Board of Commissioners of Agriculture and Forestry, for the calendar year ending December 31, 1908; 218 pp.; 34 plates.
"Notice to Importers," by H. E. Cooper; 4 p.; 1903.
"Digest of the Statutes Relating to Importation, Soils, Plants, Fruits, Vegetables, etc., into the Territory of Hawaii." General Circular No. 1; 6 pp.
"Important Notice to Ship Owners, Fruit Importers and Others. Rules and Regulations Prohibiting the Introduction of Certain Pests and Animals into the Territory of Hawaii." General Circular No. 2; 3 pp.; 1904.
"Law and Regulations, Importation and Inspection of Honey Bees and Honey." General Circular No. 3; 7 pp.; 1908.
"The Hawaiian Forester and Agriculturist," a monthly magazine. Vols. I to V; 1904-1908. To be obtained from the Hawaiian Gazette Co., Honolulu. Price \$1 a year.

DIVISION ON ENTOMOLOGY.

- "The Leaf-Hopper of the Sugar-Cane," by R. C. L. Perkins. Bulletin No. 1; 33 pp.; 1903.
** "A Catalogue of the Hemipterous Family Aleyrodidae," by G. W. Kirkaldy, and "Aleyrodidae of Hawaii and Fiji with Descriptions of New Species," by Jacob Kotinsky. Bulletin No. 2; 102 pp.; 1 plate; 1907.
* "On Some Diseases of Cane Specially Considered in Relation to the Leaf-Hopper Pest and to the Stripping of Cane," by R. C. L. Perkins. Press Bulletin No. 1; 4 pp.; 1904.
"A Circular of Information," by Jacob Kotinsky. Circular No. 1; 8 pp.; 1905.
"The Japanese Beetle Fungus," by Jacob Kotinsky and B. M. Newell. Circular No. 2; 4 pp., cut; 1905.
Report of the Division of Entomology, for the year ending December 31, 1905. Reprint from Second Report of the Board; 68 pp.; 3 plates; 10 text figures.
Report of the Division of Entomology, for the year ending December 31, 1906. Reprint from Third Report of the Board; 25 pp.; 7 text figures.
Report of the Division of Entomology, for the year ending December 31, 1907. Reprint from Fourth Report of the Board; 18 pp.; 1 plate.
Report of the Division of Entomology, for the year ending December 31, 1908. Reprint from Fifth Report of the Board; 26 pp.; 2 plates.

DIVISION OF FORESTRY.

- * "Forest and Ornamental Tree Seed for Sale at Government Nursery." Press Bulletin No. 1; 3 pp.; 1905.
"Suggestions in regard to the Arbor Day Tree Planting Contest." Press Bulletin No. 2; 7 pp.; 1905.
"An Offer of Practical Assistance to Tree Planters." Circular No. 1; 6 pp.; 1905.
"Revised List of Forest and Ornamental Tree Seed for Sale at the Government Nursery." Press Bulletin No. 3; 4 pp.; 1906.
"Instructions for Propagating and Planting Forest Trees." Press Bulletin No. 4; 4 pp.; 1906.
Report of the Division of Forestry, for the year ending December 31, 1905. Reprint from Second Report of the Board; 77 pp.; 5 plates.
Report of the Division of Forestry, for the year ending December 31, 1906. Reprint from Third Report of the Board; 123 pp.; 4 maps.
Report of the Division of Forestry, for the year ending December 31, 1907. Reprint from Fourth Report of the Board; 70 pp.
Report of the Division of Forestry, for the year ending December 31, 1908. Reprint from Fifth Report of the Board; 85 pp.

** This Bulletin will be sent only to persons interested in the subject.

* Out of Print.

Board of Agriculture and Forestry.

PUBLICATIONS FOR DISTRIBUTION—Continued.

DIVISION OF ANIMAL INDUSTRY.

- * "Inspection of Imported Live Stock." Rule 1; 1 p.; 1905.
 - * "Inspection and Testing of Imported Live Stock for Glanders and Tuberculosis." Rule 2; 1 p.; 1905.
 - * "Concerning Glandered Horse Stock in the Territory." Rule 3; 1 p.; 1905.
 - * "To Amend Rule 1, Inspection of Imported Live Stock." Rule 4; 1 p.; 1907.
 - * "Rules and Regulations, Inspection and Testing of Live Stock." Rules 1 to 7; 10 pp.; 1908.
 - * "Quarantine of Horse Stock from California." Rule 8; 1 p.; 1908.
 - Report of the Division of Animal Industry, for the year ending December 31, 1905. Reprint from Second Report of the Board; 62 pp.
 - Report of the Division of Animal Industry, for the year ending December 31, 1906. Reprint from Third Report of the Board; 41 pp.; 3 plates.
 - Report of the Division of Animal Industry, for the year ending December 31, 1907. Reprint from Fourth Report of the Board; 104 pp.; 6 plates.
 - Report of the Division of Animal Industry, for the year ending December 31, 1908. Reprint from Fifth Report of the Board; 44 pp.
-

DIVISION OF FORESTRY.

FOREST AND ORNAMENTAL TREE SEED AND SEEDLINGS FOR SALE AT THE GOVERNMENT NURSERY.

The Division of Forestry keeps constantly on hand at the Government Nursery, seed and seedlings of the important native and introduced trees. These are sold at prices just covering the cost of collection or growing.

The list includes both forest and ornamental trees, such as Silk Oak, Koa, various species of Eucalyptus, Golden and Pink Showers, Pride of India, Poinciana, Albizzia, etc. The price of the seed varies from 10 to 50 cents per ounce. The seedlings may be had for 2½ cents each, except a few kinds which are 5 cents. Seed of the various palms is also for sale; the price per 100 varying from \$1.00 to \$2.50. All seed is tested before being sent out, which insures its being good.

All communications in regard to seed or trees should be addressed to David Haughs, Forest Nurseryman, Box 331, Honolulu, Hawaii.

RALPH S. HOSMER,
Superintendent of Forestry.

DIVISION OF ENTOMOLOGY.

To give information about insects free of charge is one of the duties of this Division and Hawaiian readers are hereby invited to make inquiry in person and by mail. In order to be able to advise intelligently or send the right kind of useful insects for relief we like and sometimes it is indispensable for us to see the insect suspected or caught in the act, also specimens of the injury. In a tin with a hole or two, or a wooden box specimens may be mailed at 3rd class rates. When specimens are not accompanied by letter *always* write your name and address in the upper left-hand corner of the package. Address all communications
SUPERINTENDENT DIVISION OF ENTOMOLOGY, P. O. BOX 331,
HONOLULU, HAWAII.

EDW. M. EHRHORN,
Superintendent.

VOL. VII

FEBRUARY, 1910

No. 2

Price, 10c. Per Copy; Per Annum, \$1.00; Foreign, \$1.25.

THE
Hawaiian Forester
AND
Agriculturist

A MONTHLY MAGAZINE

OF

Forestry, Entomology and Agriculture

ISSUED UNDER THE DIRECTION

OF THE

BOARD OF COMMISSIONERS OF AGRICULTURE
AND FORESTRY.

PUBLISHED MONTHLY.

Entered as second-class matter at the Post office, at Honolulu, Hawaifi.

ADDRESS ALL COMMUNICATIONS TO

DANIEL LOGAN,
EDITOR "THE FORESTER,"

P. O. BOX 366,
HONOLULU, H. T.

For business relating to advertising or subscriptions, address

HAWAIIAN GAZETTE CO., LTD., Publishers,
VON HOLT BLOCK, 65 S. KING ST., HONOLULU, HAWAII.

CONTENTS:

	Page
Editorial.	41
Forestry at the National Fair	44
Board of Agriculture and Forestry	47
Division of Forestry.....	49
Division of Entomology	54
Rules and Regulations re Live Stock.....	58
By Authority.....	66

OFFICERS AND STAFF OF THE BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY.

COMMISSIONERS.

Marston Campbell, *President and Executive Officer.*
J. M. Dowsett P. R. Isenberg
H. M. von Holt

DIVISION OF FORESTRY.

Ralph S. Hosmer, *Superintendent of Forestry and Chief Fire Warden.*
David Haughs, *Forest Nurseryman.*
Joseph F. Rock, *Botanical Assistant.*
Louis Margolin, *Forest Inspector.*
David Kapihe, *Forest Ranger for Tantalus.*

DIVISION OF ENTOMOLOGY.

Edward M. Ehrhorn, *Superintendent of Entomology and Chief Inspector.*
 Albert Koebele, *Consulting Entomologist.*
 *Assistant Entomologist.*
 D. B. Kuhns, *Inspector's Assistant.*
 Louis Lewis, *Assistant in Inspection.*
 Fred Muir, *Beneficial-Insect Collector.*
 Bro. M. Newell, *Fruit and Plant Inspector, Hilo, Hawaii.*
 Robert R. Elgin, }
 W. O. Aiken, } *Honorary Fruit* { *Mahukona, Hawaii.*
 W. D. McBryde, } *and Plant Inspector* { *Kahului, Maui.*
 Dr. W. B. Deas, } *at* { *Koloa, Kauai.*
 Wm. Robb, } { *Hana, Maui.*
 { *Lahaina, Maui.*

DIVISION OF ANIMAL INDUSTRY.

Victor A. Nørsgaard, *Superintendent of Animal Industry and Territorial Veterinarian.*
L. N. Case, *Assistant Territorial Veterinarian.*
John Vanhuizen, *Live Stock Inspector.*
J. C. Fitzgerald, *Deputy Territorial Veterinarian for Maui.*
H. B. Elliot, *Deputy Territorial Veterinarian for Hawaii.*
A. R. Glazyer, *Deputy Territorial Veterinarian for Kauai.*

CLERKS AND STENOGRAPHERS.

Miss Melika Peterson, Miss E. M. Kuhn

EDITOR OF THE "FORESTER."

Daniel Logan

LIBRARIAN

Miss Ella K. Dayton

THE HAWAIIAN FORESTER AGRICULTURIST

VOL. VII

FEBRUARY, 1910

No. 2

FOR MUTUAL INSTRUCTION.

It is desired to make this magazine of practical benefit to the homesteader in the country and to the home-owner in town. This can not best be done without the coöperation of those worthies, as well in asking for information as in giving it. Through the medium of these pages we trust that the experts in the different divisions of the Bureau of Agriculture will solve some of the difficult problems that beset the rural and the urban home-maker. On the other hand, it may not be too much to ask that those who have overcome difficulties in either of the situations mentioned will not be slow to give the benefit of their experience to the beginner or the discouraged experimenter through the same medium.

From the scientific experts we should bespeak replies to questions, or voluntary contributions, in popular science style, so to speak, avoiding technical expression above the understanding of the man of average intelligence. From the men who do things with the soil and in the breeding of bird, beast or bee, we should invite statements of their methods as clear and concise as they can make them. Where differences of opinion may develop which can not be referred to diverse conditions, it will be useful to have all the facts likely to aid the judgment of inquirers brought out in friendly discussion. Those familiar with the annals of sugar planting and manufacture in these islands will not need to be told how valuable full and free discussion of mooted questions is to any industry.

To make this a magazine of practical information, therefore, we have already taken steps to procure articles of instruction from the experts, besides which with the assistance of readers we hope to be able to establish a regular department of questions and answers.

THE CITY BEAUTIFUL.

With the rapid expansion of Honolulu, it is gratifying to notice symptoms indicating municipal action toward system in regulating the construction of sidewalks in residence districts, with some promise of the adoption of the modern plan of having the side paths proper only occupying a moderate proportion of a generous width of parking space. There is an element of combined economy and utility in such a plan which makes a strong argument in its favor apart from esthetic considerations. Pending the time coming which many people deem inevitable, when owners will have to bear the burden of civic improvements upon their frontages, the rapidly increasing street mileage presents a problem of construction and maintenance, both, which is taxing all available resources to solve with general satisfaction. With most of the streets in new additions laid out at a width of fifty feet, a parking space of twelve feet on each side will, save in exceptional cases, leave an ample breadth of roadway. The more narrow a roadway serving all necessary demands is, the less will be the area to macadamize or pave, and hence the greater excellence of construction which can be afforded, or a saying made which can be taken out in increased mileage, as circumstances dictate. Then when it came to maintenance, the economical advantage of reduction of highway area would, in a period of years, be simply prodigious.

It is obvious to casual observation that the methods of road building in the city residence districts which have been in vogue hitherto have been not only extravagant in cost but productive of positively baneful results. The traffic upon excessively wide paving area leaves an unused margin of roadway on either side on which dirt accumulates and foul weeds attain rank growth, making what should be delightful avenues and attractive driveways into filthy lanes—to residents a source of germ-laden dust clouds in dry weather and a nuisance of mud in wet, and to pleasure drivers stretches of ugly wilderness to be avoided at all times.

When the question of appearances is considered, the modern plan of moderate paving area and generous parking space must be admitted to promise more for "the city beautiful" than almost any improvement that can be commended to the district clubs having that object in primacy. Only with adequate parking space can trees be grown upon the street sides without having them an obstruction either on driveway or side path. By the two improvements—the institution of parking space and the abolition of fences—every individual residence district of Honolulu would constitute one handsome park, while the closer these districts would draw together in the march of development the nearer would this mid-pacific metropolis come to deserving the characterization of one great park comprising plain and valley, mountain and oceanside.

The Robinson ideals should not have been so early forgotten as would appear to be the case. They included the parking of streets. When local enthusiasm stirs again on the subject, we shall see not only new sections possessing themselves of bourgeoned and blossomed avenues, but the older sections of the city will be reforming their ways to the same beautiful purpose.

PUBLIC LANDS.

In a regular department readers may look for the transactions of the Public Lands Office month by month. It happens that last month there was almost no completed transactions to report. A certificate of occupation was granted to Mrs. Annie Solomon for a homestead of 2.32 acres at Wailuanui, Koolau, Maui. The timber license issued January 5 to Hawaiian Development Company, Ltd., for lands at Kaohe, Puna, Hawaii, for ten years at \$5.00 an acre, was fully described in the last number of this magazine.

Besides its prime functions of developing forest wealth and conserving the water that is the life of the land, the Division of Forestry stands always ready to serve the general public in minor ways. It will do what it can to transform highways into avenues of beauty, park the towns and—in its Arbor Day service—train the children for tree-lovers and surround the schools with delightful groves.

With soldiers and sailors and tourists swarming in Honolulu, it will be wise thrift for the owner of a home plot to produce a little for the pot. And he need not feel afraid of spoiling the market for the fellow who makes his living that way. There will not be any danger of prices tumbling until the import figures in the trade returns dwindle some hundred thousands.

Public opinion has worked a change for the better in the handling of animals in transportation, according to the Executive Officer of the Board, yet scientifically suggested self-interest should be as potent as sentiment in causing stock-raisers to insist upon the most gentle treatment possible of animals bound for market.

Don't omit consulting the list of publications for distribution on the third cover page. It may contain just what you want to solve some worrying difficulty.

FORESTRY AT THE NATIONAL FAIR.

THE UNITED STATES AGRICULTURAL AND INDUSTRIAL EXPOSITION
· ORGANIZED TO HOLD PERMANENT NATIONAL EXPOSITION.

Among the various departments of the Exposition forestry will have prominent place. The Exposition will set aside a large tract of land devoted to the culture and propagation of trees suitable for the various climatic conditions of the country with special research into the best known varieties for forests having been denuded by fires and those states included in the dry or arid portion. The Forestry building, plans for which are now under consideration, will be one of the most modern construction and adapted in every way to the best methods for practical work. With a unanimity never before paralleled the people of the country are demanding that a stop be put to the wholesale destruction and waste of forests.

The progress in the work of education, both in the schools, by private individuals and states is unprecedented. With the aid of eminent lecturers and instructors in Forestry and Nature Study the Exposition proposes to take up the work in the most practical manner. As in all other departments, the Exposition will offer valuable premiums and medals for state exhibits and other aids.

The United States Agricultural and Industrial Exposition has been incorporated with a capital of one million dollars to hold a permanent national annual exposition in one of the middle western states. A number of cities and railroads are in correspondence with the managers of the Exposition offering inducements to locate with them and asking that their claims be considered before the permanent location is selected.

OBJECTS OF THE COMPANY.

The objects of the company are: To organize, and to hold the United States Agricultural and Industrial Exposition, finance and hold expositions, fairs, exhibitions and meetings for the promotion, improvement of and education in the arts, manufactures and products of the soil and mines, and by exhibiting displays of agriculture, floriculture, horticulture, forestry, animal husbandry, mechanical and domestic arts, to illustrate the general development, resources, products and advantages of the United States, territories and insular possessions.

BOARD OF DIRECTORS.

The Board of Directors are as follows: Hon. Albert E. Brown, Treasurer New York State Fair, and Secretary New

York State Breeders' Association, Syracuse, N. Y.; I. D. Graham, Editor the Kansas Farmer and Secretary of the Kansas Improved Stock Breeders' Association, Topeka, Kansas; Geo. S. Walker, Secretary of the National Wool Growers' Association and Secretary of the State Board of Sheep Commissioners, Cheyenne, Wyoming; Jos. E. Wing, Agriculturist and Secretary of the Dorset Horn Association, Mechanicsburg, Ohio; Dr. B. F. Dixon, Auditor for the State of North Carolina, Raleigh, N. C.; Charles W. Bush, Counselor-at-Law, Wilmington, Del.; Jas. Handly, Horticulturist and Publisher, Quincy, Ill.; Robert P. Lyon, Treasurer, Hartford, Conn.; E. Alexis Taylor, Director General of the Company.

ADVISORY BOARD.

An Advisory Board, numbering over 250, represents every phase of agricultural and industrial interests and every section of the country. The members of the Board representing the forestry department are among the leading professors and scientists of the country.

The forestry members of the Advisory Board are: Prof. H. S. Graves, Chief of Forestry Department, Washington, D. C.; Miss L. A. Finch, Corresponding Secretary Tri-Counties, Reforestation Committee, Riverside, Cal.; Jas. S. Whipple, Commissioner State of New York, Forest, Fish and Game Committee, Albany, N. Y.; C. H. Bailey, Secretary Conservation Association, Seattle, Wash.; F. W. Besley, State Forester, Baltimore, Md.; Prof. F. J. Phillips, University of Nebraska, Lincoln, Neb.; W. R. Brown, Secretary Forestry Committee, Berlin, N. H.; Ellsworth Bethel, Secretary Colorado Forestry Association and President Colorado Academy of Science, Denver, Col.; R. T. Fisher, Forest School, Harvard, Cambridge, Mass.; Dr. C. A. Shenck, Biltmore Forest School, Biltmore, N. C.; E. E. Ring, Forest Commissioner, Augusta, Maine; Thos. V. Wells, Editor of Forestry and Irrigation, Washington, D. C.; Ralph S. Hosmer, Superintendent of Forestry, Honolulu, H. I.; Prof. Alfred Ackerman, State College of Agriculture, Athens, Ga.; Fred J. Grace, Reg. and Commissioner of Forestry, Baton Rouge, La.; Edwin A. Start, Executive Secretary American Forestry Association, Washington, D. C.; John H. Wallace, Commissioner Department of Game and Fish, Montgomery, Ala.

Thirty-eight governors have personally accepted the position of vice-president for their states, assuring the management of their full sympathy with the project, offering their unreserved aid to start the American Exposition to a successful career.

The Exposition is not to be a world's fair, but a permanent national exhibit, an exposition which will present all the resources and handicraft in the United States, before all her people, not in

the form of statistics but in the tangible reality. Every phase of agricultural, industrial and educational importance is to be represented, a complete replica of America of today, and from this will be learned the lesson of what the United States can be made to be.

It is the desire of the Exposition to secure a location as near the center of trade and population as possible, and as quickly as the site is selected the work of construction will begin immediately.

Mr. E. Alexis Taylor, the pioneer of the permanent national idea, is an agriculturist of wide experience and a man born with every phase of fair management fully developed. He has been chosen Director General.

The temporary headquarters of the Exposition, pending the permanent location, are at Hartford, Conn., where all enquiries should be made.

Combined fruit and passenger steamships of the proper type under local control would permit Hawaii not to care whether school kept or not in Washington when ship subsidy or coastwise suspension bills were on the congressional calendar.

Sugar is likely to be king for a good while yet, but a sturdy family of industrial princes is growing up—their royal highnesses Coffee, Pineapple, Cotton, Fruit, Honey and Fibre for instance.

The man with a real bee in his bonnet is doing his share to make diversified industry in Hawaii important. See the trade returns for honey and wax exports.

Hawaii has need to be discontented with its big annual fodder bill more even than with its lack of transpacific passenger accommodation.

Agriculture in Hawaii is great enough to bring the Territory all the ocean freight accommodation it requires without any ship subsidy.

Development of general farming and the animal industry is wanted in Hawaii to conserve the wealth that sugar produces.

Conservation will do more for Hawaii than all the “new constitutions” for which its fervid patriots of yore ever yearned.

Rough usage of cattle is bad for either meat or milk.

BOARD OF AGRICULTURE AND FORESTRY.

A regular meeting of the Board of Commissioners of Agriculture and Forestry was held at the office of the Superintendent of Public Works, in the Capitol, on Wednesday, February 9. At this meeting it was decided to meet but once a month thereafter, on the third Wednesday of every month. Those present were Mr. Marston Campbell, president and executive officer; Messrs. D. P. R. Isenberg, H. M. von Holt and J. M. Dowsett, members.

Mr. Campbell, after the opening routine, made an oral report on the Pupukea-Paumalu forest reserve, saying:

"Mr. Holt and I went to Pupukea by automobile; took horses and went up the trail to the line dividing Waimea and Pupukea, close to the summit where the two lines meet. We crossed over and came down the line to Kaunala and Pupukea. The forest conditions as I saw them were marvelously better than have been represented in petitions and reports and by comments from various persons. There is much growth of koa, sandalwood and other trees. It was also found that the tanglefoot of uluhe is approaching the Waimea and Pupukea sides. There are few cattle trails over this district and we saw very few traces of cattle. As a result of my investigations it is my judgment that this district should be declared a forest reserve. The homesteaders are required to fence the upper boundaries, under their agreement, which then leaves the boundaries between Konawai-kaala and Kaunala to be fenced. This makes a tri-shaped piece of ground. The expense of the fence would not be very much, as this would be borne partly by the Government and the Oahu Railway Company and, should we fail to protect this area of from 1000 to 1200 acres from the marauding cattle, the slopes would unquestionably require reforestation within a very few years. I should recommend that this Board take action to have this land set aside by the Government as a forest reserve; the fencing to be done, however, at the time the division fence is put up between the lands of Mr. Wheeler and the Government, which will have to be before Mr. Wheeler secures the patent to his land."

Mr. von Holt said that the fencing would cost about \$1500, and half of that, \$750, would be at the Government's expense.

On motion of Mr. Dowsett, seconded by Mr. Isenberg, it was decided that the committee's verbal report be accepted and that the Board recommend, for the Governor's approval, the setting aside of the remaining lands of the Pupukea-Paumalu homesteads as a forest reserve.

Mr. Campbell told of a recent interview had by him with Mr. T. H. Petrie in regard to the Kohala forest matter. Mr. Petrie informed him that it was unnecessary to secure a permit to pay in the pro rata of the money which is to be collected from the

plantations. The Kohala people could only get together \$24,000 and there were twenty-four hundred acres to be acquired. With reference to his former suggestion that the Woods Estate be offered \$24,000 for its lands, appraised at \$10 an acre, and if that was refused that the Board should decide whether it should avail itself of the right of condemning property for public uses, he now recommended that all proceedings hitherto be rescinded and that the Kohala people be granted until March 1, 1910, to arrive at a definite conclusion as to what action they wish taken. It was so voted.

It was voted that the monthly report of the Superintendent of Forestry be accepted and placed on file. Similar action was taken with regard to the report of the Superintendent of Entomology, and the report of the Superintendent of Animal Industry.

Mr. von Holt said that he was notified of a special public meeting called by Mr. Isenberg to discuss new rules and regulations regarding the handling of live stock. At the time and place he was the only member present and Dr. Nörgaard was the entire public, consequently nothing was done and the doctor adjourned the meeting.

Mr. Campbell said that agitation had resulted in the better handling of cattle, and by accomplishing that they had done a great deal. The point now was whether or not present conditions, with the well known improvements in the handling of cattle, were satisfactory.

Mr. Dowsett stated that the matter ought not to be dropped and that the special committee should make a full report.

Mr. Isenberg requested further time, promising a report of the committee at next meeting, which was granted.

A matter relating to the inspection of imported animals was referred to the executive officer, who promised immediate attention to it.

The executive officer read a letter from Mr. Jacob Kotinsky, of January 18, tendering his resignation as assistant entomologist, to take effect January 1, 1910, also a letter to Mr. Kotinsky asking him to report what progress he has made with the investigations for the Division of Entomology placed in his hands.

A report of Mr. Louis Margolin was read, dated January 23, 1910, on the planted grove on land of Dr. B. D. Bond, Kohala, Hawaii.

Mr. Campbell called attention to the good work done by Mr. J. F. Rock, in the way of identifying and describing every tree and shrub found on the islands, many of which have never before been given a name. He recommended that the Board publish the results of Mr. Rock's investigations as a valuable contribution to scientific literature.

The executive officer read tenders received from bidders for planting with trees three water reserves, A, B and C, on the Pupukea homesteads, Koolauloa, Oahu. After some discussion,

in which Mr. Campbell assured the Board that the work under the contract would be cheaper than the work could be done by the Division of Forestry, it was decided on motion that the contract for water reserves A and B, at four cents per tree for planting and caring for the trees until they reach a height of three feet, be awarded to the Oahu Pineapple Company (Messrs. Winston & Looney), but that a decision on the planting of Lot C be reserved until next Board meeting.

DIVISION OF FORESTRY.

January 31, 1910.

The Board of Commissioners of Agriculture and Forestry,
Honolulu, Hawaii.

Gentlemen:—I have the honor to submit the following report of the work of the Division of Forestry for the month of January, 1910:

EUCALYPTUS INVESTIGATION.

On January 4 Mr. Margolin went over to Hawaii to complete the examination of the planted groves on that island. During the first week in February he will go to Maui, where he will remain for some weeks working in the groves at Haiku, Paia and Makawao. During his stay on Hawaii Mr. Margolin has, by my direction, visited the logging operations in the Puna District. The purpose of this visit was to enable him to become familiar with the milling of ohia, for because of experience with similar problems in mills on the mainland, it may well be that he can offer helpful suggestions as to the working up of the slabs and other waste wood into a useful by-product. This is a serious problem with ohia; its solution would benefit both the lumber company and the government.

WORK OF THE BOTANIST.

Mr. J. F. Rock, the botanist assistant of the Division of Forestry, has during the past month and a half been working up plant collections made by him during trips taken at previous times. He has now examined 1127 specimens and determined 164 species. These specimens will be poisoned, properly mounted and labeled and definitely placed in the Herbarium. Mr. Rock is also preparing, for exchange with certain other Herbariums, duplicate specimens of Hawaiian plants. In return for 96 plants recently sent to Dr. J. H. Maiden, the government botanist at Sydney, the Division of Forestry has received 100 plants of Australian species

closely related to genera represented in Hawaii. These specimens will be of no small value for comparison.

FOREST EXTENSION.

Some weeks ago the Board referred to this Division a request of the Land Commissioner that steps be taken to plant up with forest trees the water reserves in the homestead tract at Pupukea on this island. Accordingly, following an offer of certain of the homesteaders to do the work, a planting plan was drawn up and preparations made for furnishing trees from the Government Nursery. Recently it has appeared desirable to modify this program by having all the work done under the immediate supervision of the Division of Forestry. A call for bids to do the planting is now being advertised. The bids will be opened February 9.

During the past month considerable activity in tree planting has been manifested by individuals and corporations. Trees for this work to the number of 8150 have been sent out by the Government Nursery. Among those to whom trees in considerable number have been supplied are the Waialua Agricultural Company, Mr. W. W. Goodale, manager, and the O. R. & L. Co.'s ranch department, Mr. H. M. von Holt, manager. Small lots of trees are constantly being supplied to homesteaders and others desiring from a half dozen trees up, and hardly a day passes but requests for information in regard to growing plants are answered by the staff at the nursery, usually in person, as those desiring advice generally call themselves. This sort of work takes up not a little of Mr. Haughs' time, but it is time well spent, for the information given out is at once put to practical use.

THE POULTRY SHOW.

Following the custom of other years, this Bureau had an educational exhibit at the fifth annual show of the Hawaiian Poultry Association, held at the National Guard shooting gallery from January 12 to 15. Some thirty odd linear feet of table and wall space were occupied. The Division of Forestry exhibited a collection of plants illustrative of nursery methods, maps showing the forest reserves, herbarium specimens of Hawaiian plants and photographs of native and planted forests in Hawaii.

YEARBOOK FOR 1908.

As usual the Delegate to Congress has deposited with this Board his quota of the yearbook of the U. S. Department of Agriculture for distribution. Copies have been sent out to a selected list of persons, to the schools and to those who have made direct

application. Some copies are still available and will be sent on request.

STRENGTH TESTS OF OHIA WOOD.

At the suggestion of the Superintendent of Forestry an arrangement has been made between the Hawaiian Development Company and the College of Hawaii whereby systematic strength tests are to be made with ohia and lehua. Colonel Samuel Johnson, superintendent of the logging operations at Pahoa, Puna, Hawaii, has shipped to the college a number of pieces of sample sizes, some seasoned and some green. These will be broken and otherwise tested in the big Riehle testing machine in the engineering laboratory. The figures obtained will be made public in due course and should be of no small interest. A little later it is expected that similar tests will be made on a number of kinds of eucalyptus and other exotic woods that have been grown locally.

FOREST TREE SEED FOR MOUNTAIN PLANTING.

Additional lots of seed of pine, fir and spruce trees from the mainland have been received recently from a number of national forests in California and other western states. The seed will be sown in the nurseries that have been established with the aid of federal funds on the upper slopes of Mauna Kea and Haleakala. Eventually the seedlings resulting will be planted out in the experimental plots on these mountains.

THE FORESTER.

During the interregnum between the resignation of Mr. L. G. Blackman as editor of *The Forester* and the appointment of Mr. Daniel Logan to succeed him I have, by direction of the executive officer, devoted some time this month to getting out the January issue of that magazine. It may perhaps be noted here that a special article on the poultry show and a complete prize list makes this number of *The Forester* of value for reference to local poultry fanciers.

Very respectfully,

RALPH S. HOSMER,
Superintendent of Forestry.

THIMBLE BERRY INVESTIGATION.

Honolulu, Hawaii, February 9, 1910.

Hon. Marston Campbell, President Board of Agriculture and Forestry.

Dear Sir:—Last August Mr. J. F. Rock, botanical assistant in this Division, submitted to you a preliminary report on the "Hitch-

cock" or "Thimble Berry" that has become a pest on the island of Hawaii. He has now prepared a second and final report, which contains the information available in August together with data obtained since then. I transmit a copy of Mr. Rock's report herewith.

Very respectfully,

RALPH S. HOSMER,
Superintendent of Forestry.

Honolulu, Hawaii, January 22, 1910.

Mr. R. S. Hosmer, Superintendent of Forestry,
Honolulu, T. H.

Sir:—I beg to present herewith a supplementary report on the so-called "Hitchcock" or Thimble Berry, now a pest on Parker Ranch, Hawaii.

Last August during your absence from Honolulu, I presented a preliminary report on the above mentioned plant to Mr. Marston Campbell, president and executive officer of this Board. I stated then that I was unable to identify positively the specific name of the troublesome plant in question. I determined it as belonging to the family *Rosaceae* genus *Rubus* Sect. IX. *Lampobatus* and being *Rubus jamaicensis* (?).

Further investigation showed that the plant resembles strongly *Rubus rosaefolius* though also on the other hand *Rubus jamaicensis*. In Waipio Valley, Hawaii, I found a raspberry almost identical with the one occurring on Parker Ranch with the exception of the very showy *double* flowers; this latter species has all the characters of *Rubus rosaefolius*, a cosmopolitan plant occurring in all warmer countries, especially in the West Indies where it grows wild in the mountains.

In order to get more definite data regarding the introduction of the plant I communicated with Mr. D. Howard Hitchcock who informed me that the plant in question was brought here by his father in the early eighties from Jamaica. As there are only two species of raspberries endemic in Jamaica, namely, *Rubus jamaicensis* and *Rubus alpinus*, the latter however less common besides the wild growing cosmopolitan species *Rubus rosaefolius*, I came now to the conclusion and can state definitely that said plant is a cross (perhaps a natural cross) of *Rubus jamaicensis* and *Rubus rosaefolius*, as the characters of both species are more or less constant in the various plants of our Thimble Berry.

The following is a description of *Rubus jamaicensis* and *rosaefolius*:

(a) An erect bush evergreen in warm countries, glabrous or somewhat pubescent-hirsute: leaves odd-pinnate, the lateral leaflets 2-7 pairs, all the leaflets ovate-lanceolate or lance-oblong,

acuminate, strongly many veined and very sharp-serrate, more or less silky hairy beneath: flowers solitary or in few flowered clusters an inch and a half across, white showy; fruits erect, bright red, long thimble-shaped, usually about an inch high, very showy, edible. It sometimes occurs in double form and is then known as variety *coronarius*.

(b) Shrubby, sometimes trailing, prickles recurved; leaflets 5-3, elliptical-oblong, pointed, pubescent above, hoary-tomentose beneath, unequally serrate, primary veins approximate; petiole long with the under side of the midrib prickly; racemes compound, villous; petals obovate, as long the calyx-segments; fruit ovoid, twice as large as the calyx. Habitat, Jamaica, common in the mountains.

The question of exterminating the same by means of insects is however a delicate one. The only insect that could come into consideration would have to be a strictly specific one; to secure the same it would be implicitly necessary to study the conditions in Jamaica and to find if the same have specific enemies. And again only such could come into consideration that would attack the flowers, flower buds or canes of said species only. To introduce others than specific should be prohibited as they would attack other plants belonging to the *Rosaceae* or rose family like peach trees and others, nothing said of our native raspberries, one of which furnishes fodder for cattle.

The raspberries have quite a number of enemies attacking either roots, buds, flowers or ripe fruits, as for example the raspberry beetle (*Byturus tomentosus* Fab.), the raspberry fruit beetle (*Byturus unicolor* Say), who eats out blossom buds. The raspberry bud caterpillar (*Lamphronia rubiella* Bjerk.), whose larvae pupate in the flower buds and leaves. *Carpophilus brachypterus*, a beetle of small size found numerous in the fruits of raspberries who secrete themselves in the cavity of the berry about the receptacle. The most common enemy of the raspberries is a weevil (*Anthonomus signatus*) who punctures the buds and feeds on the pollen within them. The flower in general is its first resort for food.

As stated before all these insects would unquestionably attack other members of the rose family and perhaps also the flowers of other fruit trees and therefore would not be recommendable for importation.

Respectfully submitted,

JOSEPH F. ROCK,
Botanical Assistant.

P. S.—Information to the entomological part of this report was given by Mr. Kotinsky with corrections by Mr. Ehrhorn, Superintendent of Entomology.

PRELIMINARY REPORT ON THE HITCHCOCK OR THIMBLE BERRY
GROWING AT PARKER RANCH, HAWAII.

In a letter sent to me by Mr. R. S. Hosmer, Superintendent of Forestry, during my stay at Parker Ranch, Hawaii, I was instructed to secure specimens of the so-called Hitchcock or Thimble Berry in its different stages of growth and make notes and observations on the same.

In compliance with this instruction I went to Paauhau No. 1, 2 and 3 where the plant is found abundantly in company with the erroneously called German Ivy (*Senecio mikanioides*). Its specific name I had not been able to secure positively, on account of the limited literature on the order Rosaceae respectively the polymorphous Genus *Rubus*. According to Engler and Prantl's *Natuerliche Pflanzenfamilien* it belongs to the Order Rosaceae Genus *Rubus*, Section IX, *Lampobatus*, and is in all probability *Rubus jamaicensis* Sw.

In a wide sense there are between 180 and 200 species of *Rubus* with a legion of varieties so that up to the present time there are 1,500 species described.

The plant in question is an erect armed shrub subherbaceous of eight inches to three feet in height with pinnately divided leaves. Calyx free, deeply five lobed, persistent petals five, stamens numerous. Carpels numerous, with two pendent ovules in each, only one of which matures. Styles subterminal. The fruit, a granulated berry, is oval, an inch or more long, three-quarters of an inch wide, and is formed by the union of the succulent carpels round the conical or shortly oblong dry receptacle. Flowers in terminal leafy panicles. The fruit is sweet and quite palatable. It is most abundant at Paauhau No. 1, 2 and 3, especially 2 and 3, where the soil is rich and rainfall very frequent.

In the drier regions as Nienie and Paauhau it is only found alongside of fallen tree trunks which afford them shade and moisture. Its spread into the districts of Mana, Punohu, Makahalau, etc., is not to be feared on account of the dryness of that region.

As the plant is only reproduced by seed it will be necessary for the entomologist to find an insect which will attack and destroy the fruit before it matures.

Respectfully submitted,
JOSEPH F. ROCK,
Botanical Assistant.

DIVISION OF ENTOMOLOGY.

Honolulu, Hawaii, February 1, 1910.

Honorable Board of Commissioners of Agriculture and Forestry,
Honolulu.

Gentlemen:—I respectfully submit my report of the work of the Division of Entomology for the month of January.

Of 34 vessels boarded we found fruit, plants and vegetables on 18. These shipments received the usual rigid inspection and were disposed of as follows:

<i>Disposal with principal causes.</i>	<i>Lots.</i>	<i>Parcels.</i>
Passed as free from pests.....	884	22,568
Fumigated before releasing.....	31	39
Burned	21	102
	<hr/> 936	<hr/> 22,709

POSSIBLE PESTS INTERCEPTED.

Citrus fruits, Tangerines, Pomelos and Oranges from the Orient, prohibited from landing under rules of the Board, were found infested with scale and *Cladosporium citri*. Orange trees from Japan affected with *Cladosporium citri* were burned. Orchids from Manila were carefully gone over and fumigated on account of finding several scale insects and Curculionid borers. Peach trees from Florida infested with Peachroot borer. Cherry tree from Japan infested with wood borer. Several lots of Xmas berries and greens infested with common scale insects.

To further emphasize the importance of the ruling prohibiting the importation of fruit from the Orient and Polynesia I wish to draw attention to the fact that recently three new species of fruit flies of the same genus as our melon maggot (*Dacus*) have been found and described. Two of these were reared from guavas and one species was raised from orange. The great damage done by the melon maggot to our curcubits is sufficient warning and we must endeavor to keep out those species which would attack our citrus and guavas.

Since my last report I have received the following letter from Mr. A. Koebele in answer to one in which I questioned him regarding the necessary parasites for scale and melon maggot. I embody all the correspondence for future reference:

Honolulu, T. H., November 18, 1909.

Mr. A. Koebele,

Waldkirch in Breisgan, Baden, Germany.

My Dear Koebele:—I have your letter of August 20th and should have answered the same before. I found this letter here waiting for me. Please accept my sincere thanks for your good wishes and advice. I have heeded your warning and so far my sister and I feel very well and we are comfortably settled in a little cottage, about four blocks from the office, near Mrs. Jaeger's place.

All your sendings have been faithfully forwarded by Mr. Williams, who promised me that he would attend to this matter for

me. My successor is Mr. Dudley Moulton and Williams is still the inspector. No doubt Mr. Swezey has notified you about the various shipments. I understand that he has been successful in rearing some home-bred material from the parasites.

I find things here very fine, but the *Pseudococcus nipae* and the melon fly need your attention. Governor Cleghorn is very much distressed about his trees, which are covered with *P. nipae* and although *Cryptolaemus* is plentiful, it does not seem to go for the *P. nipae*, preferring *P. virgatus* and others. A great many complaints are coming in about the infestation of alligator pear trees and other shrubbery with *P. nipae* and all want a good parasite for it. Please advise me what you deem best in this matter. Is there anything in Mexico for it? The parasites which Compere sent for fruit flies from India did not help the melon maggot, so that we are up against it yet and this pest is getting very bad. I hope that I will hear from you about all these matters.

Please give my kindest regards to Mrs. Koebele and believe me ever,

Yours very truly,

EDW. M. EHRLHORN,
Superintendent of Entomology.

Waldkirch i/Br., Baden, 14/12/09.

My Dear Ehrhorn:—Many thanks for your letter of November 18. To me it is hard to hear that so many of the parasites perished on the way and chiefly from material detained at S. F. This is a point. This parasite is inactive at a temperature below 55 deg. Fahrenheit, in consequence would hardly hatch out if not kept in heated room. I kept my breeding up until I heard from Swezey of the rearing of his first brood—only then I shipped my last lot—not even then, still have a few on hand if all should fail.

From Mexico I forwarded some ladybirds—*Hyperaspis*, if I remember rightly, to Kotinsky. The same was found on *Pseudococcus nipae*, in the Valley of Mexico, but I have never heard a word about this as of other material sent—as from Arizona numerous Coleopterous cocoons which I took to be *Hister* destroying all dipterous larvae and puparia under cowdung in fields. Those larvae would follow the diptera down to two inches or more into the ground and devour everything, forming solid, hard cocoons out of soil. Only very shortly (on December 6, 1909) I mailed two vials with those Coccids on grass (you named one specimen for me at Alameda), felt-like, white exudations in which eggs are laid. From this I bred Chalcid that may do on eggs of *Pseudococcus* or other related Coccids. We must try. The Coccid is American and from these we must get a proper parasite. I will yet see to it.

Enemies for melon fly can be had closer at home, Japan and China. It should be a comparatively easy matter to get them over. Why not have lots of cucumbers shipped over in bags laid in boxes so that larvae of melon fly could not escape. You would then breed parasites out. Most any Jap and Chinese merchant could do it for you. Have it from both places.

Remember me kindly to Mr. Giffard.

Ever yours sincerely,

A. KOEBELE.

Honolulu, T. H., January 27, 1910.

Mr. Albert Koebele, Waldkirch i/Br., Baden, Germany.

My Dear Koebele:—Your letter of December 14, 1909, came to hand and I note what you say regarding the shipments of parasites. It is really too bad that we have not had better results and I am sure that Mr. Williams is doing all he can to help us. I know that while I was attending to these I very often just missed a boat and then had to place the shipment on ice for a week or ten days. I had a conference with Mr. Swezey about the matter and we both feel that it might be well for you to send your shipments direct to Honolulu as we think that six days longer would not materially interfere with the parasites, especially as we find that the last shipments have been kept longer than that in San Francisco waiting for boats.

In regard to the shipment of the *Hyperaspis* species (*Hyperaspis* 8-notata) which you sent to Kotinsky and of which you said that no report had been given, will say that I have looked up the record and find that two colonies were liberated, one at Mrs. Jaeger's place and the other at Governor Cleghorn's place. As soon as the warm weather sets in I shall personally investigate and see if any trace of this species can be found.

In regard to the sending of *Hister* from Arizona, these were liberated by Mr. Swezey when received.

I received two vials containing the scale insects you mention. The scale is *Eriopeltis festucae*, a common grass scale from Europe and Canada. I succeeded in raising a few Chalcids from these and turned them out on tree infested with *Pulvinaria psidii*. As *Eriopeltis* belongs in the *Lecanium* group the parasites will probably attack such things as *Antonina* and *Ceroplastes* and *Pulvinaria*.

We will inquire about the melon fly parasite in Japan and China and see what can be done regarding the shipment of maggot infested cucumbers.

Very truly yours,

EDW. M. EHRLHORN,
Superintendent of Entomology.

It is very interesting to note what Mr. Koebele says about the melon maggot parasite in China and Japan. We all had the impression that India was the country where the parasite existed. I shall get in touch with entomologists in these countries and see what can be done in the matter. The promiscuous sending of cucumbers as suggested by Mr. Koebele is somewhat dangerous, however now that we have a base to work on we can at least make a strong attempt to get the desired parasite.

Brother M. Newell, Inspector at Hilo, reports that seven foreign vessels occupied his time during January, with 105 lots and 1819 parcels of fruit and vegetables. Seventy-five sacks of potatoes were found to be very dirty with adhering soil. These were held and the consignee was compelled to clean them before delivery.

Several applications for inoculated Japanese beetles were received and attended to. We can furnish these now and owing to the abundance of moisture we advise the use of the fungus at this season of the year.

Very truly yours,

EDW. M. EHRLHORN,
Superintendent of Entomology.

RULES AND REGULATIONS PERTAINING TO THE INSPECTION AND TESTING OF LIVE STOCK INTENDED FOR IMPORTATION FROM THE MAINLAND OF THE UNITED STATES TO THE TERRITORY OF HAWAII—EFFECTIVE JANUARY 1, 1910.

RULE I.—INSPECTION OF IMPORTED LIVE STOCK.

In order to prevent the introduction into this Territory of infectious, contagious and communicable diseases among live stock and other animals, local managers or agents of steamship and navigation lines or the commanding officer of any ship shall notify the Territorial Veterinarian or the local Live Stock Inspector immediately upon the arrival of any ship, of the presence on board, if any, of live domestic animals, including poultry and dogs, when same is intended to be landed in this Territory, and shall upon arrival of any ship furnish the inspecting officer with a list of the number and kind of animals taken on board from any port outside of this Territory, the number and kind destined for the Territory, the names of the owners or consignees, and a report as to the condition of health and cases of sickness or death among the animals while on board.

If necessary to remove such animals before the arrival of the inspector they must be confined on the pier in such a manner as to facilitate inspection, but should in no case be turned loose on the pier. Hogs and sheep shall be confined in temporary pens. Cattle and horses shall be tied on the pier. No animal of any description shall be allowed to leave the pier until the Territorial Veterinarian or his deputy has issued a certificate of health permitting the landing of the animal or animals in question.

In no case shall the removal of live animals from the ship for inspection or other purposes, constitute a landing until a certificate of health for such animals has been issued.

RULE II.—GLANDERS AMONG HORSE STOCK WITHIN THE TERRITORY.

It having been brought to the notice of this Board that a contagious disease known as glanders and farcy prevails among the horse stock in various portions of this Territory; therefore, in case any animal shows symptoms of glanders, the owner or person having charge of the same, or any person having reason to believe or to suspect that an animal has glanders shall immediately notify the Territorial Veterinarian or his deputy.

If the Territorial Veterinarian or his deputy decides that there is reason to believe an animal is suffering from glanders he shall at once isolate the suspected animal or animals and either submit them to the mallein test or remove them to quarantine, where they shall be kept under observation until the nature of the disease can be definitely established.

All animals which, upon examination by the Territorial Veterinarian or his deputy, are found to exhibit symptoms of glanders shall be destroyed and the carcass disposed of under the supervision of one of the above mentioned officers.

All other animals which have been exposed to the infection by being in the same stall, yard or premises, or which in any way have come in contact with an affected animal, shall be quarantined for such period as shall be required by the Territorial Veterinarian or his deputy, or submitted to the mallein test or both.

The premises where affected animals have been kept shall be disinfected under the supervision of the Territorial Veterinarian or his deputy.

All expenses in connection with the examination, testing, destroying and disposing of affected animals, as well as quarantine and disinfection, shall be paid by the owner.

RULE III.—INSPECTION AND TESTING FOR GLANDERS AND TUBERCULOSIS OF LIVE STOCK INTENDED FOR IMPORTATION.

In order to prevent the further introduction of glanders and farcy into this Territory, it is hereby ordered that:

No horse stock, (including mules and asses), shall be admitted to the Territory unless accompanied by a certificate of health showing that the animal or animals in question have been submitted to the mallein test and found to be free from glanders. Said test must be made and certificate issued by a veterinarian authorized by the United States Bureau of Animal Industry, and endorsed by the Bureau Inspector in Charge at the port of shipment.*

Any person contemplating the importation of horse stock to this Territory shall notify the Territorial Veterinarian, his assistant or deputy of the approximate time of arrival of such stock, the name and address of the consignee, the name of the vessel and the port of entry.

Upon arrival of the stock the Territorial Veterinarian or his local representative shall be notified at once and the stock held as directed in Rule I until the same and the accompanying papers have been examined by him and a permit of landing issued.

In order to prevent the further introduction of tuberculosis in cattle it is hereby ordered, that:

No cattle above the age of six months shall be admitted to the Territory unless accompanied by a certificate of health showing that the animal or animals have been submitted to the tuberculin test and found to be free from tuberculosis. The said test must be made and certificate issued in the same manner and by the same authorities as prescribed for the importation of horse stock, and the same general rules governing the latter shall apply to the importation of cattle.

In case horse stock or cattle should be landed at a port of entry where no local representative of the Division of Animal Industry is stationed and where it would be impossible for him to reach within a reasonable time after the arrival of the stock, the owner or consignee shall be allowed to remove the animals to convenient premises where care can be taken of them and where they can be kept isolated from other stock of the same kind, upon the following conditions:

The owner or the consignee shall without delay notify the Territorial Veterinarian or his nearest representative by telephone, wireless or otherwise of the arrival of the stock and the place where he has taken them to. If so directed he shall forward the papers accompanying the stock for examination by the Territorial Veterinarian or his representative.

Until the arrival of either of these officials or until he receives notification that the accompanying papers are satisfactory, the owner or consignee shall consider the animals quarantined—that is they shall be kept in a stable or enclosure where no other ani-

* See also Rule 5—Quarantine of Horse Stock Arriving From or Through the State of California.

mals of their kind are kept and where they cannot come in contact, direct or indirect, with any such animals.

Special care should be taken that the imported animals are not watered where other stock drink, but that a separate watering place is provided or the animals watered with a bucket used for no other purpose.

No animal shall leave the stable or enclosure until officially admitted to the Territory.

If any horse stock shall be found by the Territorial Veterinarian or his representative upon arrival in the Territory to be infected with glanders or any cattle to be infected with tuberculosis, the same shall be immediately destroyed and the carcass disposed of at the expense of the owner, under the supervision of the Territorial Veterinarian or his representative.

RULE IV.—INSPECTION OF SHEEP AND SWINE INTENDED FOR IMPORTATION.

In order to prevent the further introduction into this Territory of the disease known as sheep scab, hog cholera and swine plague it is hereby ordered that:

No sheep shall be admitted to this Territory unless accompanied by a certificate of health issued or approved by an officer of the United States Bureau of Animal Industry, and to the special effect that the animals are free from sheep scab or have been dipped in accordance with the regulations of the United States Bureau of Animal Industry and under the supervision of an officer of the said Bureau, and

No swine shall be admitted to this Territory unless accompanied by a certificate from the same authorities to the effect that the animals have passed a careful veterinary inspection and are free from any indication of disease, and that neither hog cholera nor swine plague has existed within a radius of 5 miles of the premises in which they have been kept for a period of six months immediately preceding the date of shipment.

The owner or importer must present an affidavit, on forms supplied by this Board, that the said certificate refers to the swine in question, that the same have been shipped from the premises mentioned in the said certificate in clean and disinfected cars, and without unloading.

Swine arriving in the Territory without such certificate and affidavit will be subject to a quarantine of two weeks at the expense of the owner or importer.

Shipments of swine which, upon arrival, show symptoms of hog cholera and swine plague will be placed in quarantine and will remain there for an indefinite period or until disposed of by slaughter, under the supervision of the Territorial Veterinarian or his deputy.

RULE V.—QUARANTINE OF HORSE STOCK (HORSES, MULES AND
ASSES) ARRIVING FROM OR THROUGH THE STATE
OF CALIFORNIA.

Owing to the fact that glanders has again made its appearance among mules arriving from California, and to the further fact that the Board of Commissioners of Agriculture and Forestry has definite information to the effect that glanders prevails in the State of California to an extent which makes it unsafe to rely on the present regulations governing the importation of live stock to this Territory, it is hereby ordered that:

Until further notice all horse stock (including mules and asses), arriving in this Territory, from or through the State of California, shall be quarantined, at the port of entry, for twenty-one days, counting from the date of departure from California.

By quarantine shall be understood the absolute segregation of such animals, on premises provided by this Board or by its officers.

If at the end of the stipulated period the Territorial Veterinarian or his deputy is not satisfied that the animals are free from glanders or other contagious diseases, the same shall be either subjected to the mallein test or continued in quarantine, or both, until released and admitted to this Territory.

All expenses in connection with the quarantining of horse stock as above specified shall be borne by the owner, importer or consignee.

While this rule remains in force the ports of Honolulu, Hilo and Kahului shall constitute the only ports of entry for horse stock (including mules and asses) coming from or through the State of California.

These rules (I-V, Division of Animal Industry), as adopted by the Board of Commissioners of Agriculture and Forestry at a meeting held in Honolulu on December 8, 1909, shall take effect upon their approval by the Governor, all previous rules of the Division of Animal Industry being repealed from the same date.

(S.) MARSTON CAMPBELL,
President and Executive Officer, Board of Commissioners
of Agriculture and Forestry.

(S.) E. A. MOTT-SMITH,
Acting Governor.

Any violation of these regulations is a misdemeanor, and punishable by a fine not to exceed \$500.00 (See Sec. 390, Chapter 28, Revised Laws 1905, and amendments thereto, Sec. 3, Act 82, Session Laws 1905, and Act 112, Session Laws of 1907).

For the information of all concerned Act 112 of the Session Laws of 1907 and Act 138 of the Session Laws of 1909 will be found below:

ACT 112.

Section 1. That Section 390 of the Revised Laws of Hawaii be and the same is hereby amended to read as follows:

"Section 390. Penalty for Violations. Any person violating any of the provisions of this Chapter, or any rule or regulation of the Board of Commissioners of Agriculture and Forestry and any master of any vessel which shall bring into this Territory any article which the Board shall at any time prohibit from being imported into this Territory; and the master of any vessel from which shall be landed any article in this Chapter required to be inspected, until he shall have received a permit to land the said articles from the Board or its officer or inspector, as in this Chapter provided, shall be guilty of a misdemeanor and shall be punished by a fine not to exceed five hundred dollars."

ACT 138.

Section 1. Section 447 of the Revised Laws is hereby amended to read as follows:

"Section 447. Reporting diseases, penalty. Any person knowing or having reason to believe that any animal on or about his own premises or the premises of another is affected with glanders, farcy or any infectious or contagious disease who shall fail to report the same forthwith to a territorial veterinarian, shall be guilty of a misdemeanor and upon conviction shall be fined not less than five nor more than one hundred dollars."

Section 2. A new section is hereby added to Chapter 35 of the Revised Laws, to be known as Section 447A and to read as follows:

"Section 447A. The purchaser of any horse, mule, or ass, which shall develop symptoms of glanders or farcy within two weeks from the date of purchase may recover the full amount of the purchase price from the vendor of such animal, together with such reasonable damages as the purchaser may have suffered; provided, however, that this section shall not apply in case the vendor, at the time of sale shall obtain from any licensed or territorial veterinarian a certificate that such animal is free from such disease, and such territorial veterinarian shall make no charge for said certificate."

The following notice issued by the Secretary of Agriculture in October, 1907, is called to the attention of everybody concerned:

UNITED STATES DEPARTMENT OF AGRICULTURE.

INTERSTATE MOVEMENT OF HORSES, MULES, AND ASSES AFFECTED
WITH GLANDERS.

The attention of managers and agents of railroads and transportation companies, of stockmen and others interested in the in-

terstate movement of horses, mules and asses, is directed to the provisions of section 6 of the act of Congress approved May 29, 1884, entitled "An Act for the establishment of a Bureau of Animal Industry," etc. This section reads in part as follows:

Sec. 6. That no railroad company within the United States or the owners or masters of any steam or sailing or other vessel or boat, shall receive for transportation, or transport from one State or Territory to another, or from any State into the District of Columbia, or from the District into any State, any live stock affected with any contagious, infectious, or communicable disease, and especially the disease known as pleuro-pneumonia; nor shall any person, company or corporation deliver for such transportation to any railroad company, or master, or owner of any boat or vessel, any live stock, knowing them to be affected with any contagious, infectious, or communicable disease; nor shall any person, company, or corporation drive on foot or transport in private conveyance from one State or Territory to another, or from any State into the District of Columbia, or from the District into any State, any live stock, knowing them to be affected with any contagious, infectious or communicable disease, and especially the disease known as pleuro-pneumonia. (23 Stat. L. 32.)

Under this section it is a misdemeanor, punishable by fine and imprisonment, for any person or corporation to deliver for transportation, receive for transportation, transport, drive on foot, or otherwise remove from one State or Territory or the District of Columbia into another State or Territory or the District of Columbia any horses, mules, or asses which are affected with glanders, as disclosed by a physical examination or by the mallein test.

It is suggested that common carriers engaged in such interstate transportation require the shipper of such animals in all cases to sign a statement to the effect that the animals offered for shipment are not affected with glanders.

JAMES WILSON,
Secretary of Agriculture.

A certificate showing that animals to be shipped to this Territory have passed a satisfactory mallein or tuberculin test issued by a veterinarian authorized by the Federal Bureau of Animal Industry and countersigned or approved by the Federal Inspector in charge of the port of shipment, will be accepted by any transportation company as proof that the animals in question are not affected with either glanders or tuberculosis.

GENERAL INFORMATION RELATIVE TO THE IMPORTATION OF LIVE STOCK TO THE TERRITORY OF HAWAII.

For the information of all concerned in the interstate movement of live stock, and more particular in the transportation and

importation of live stock from the Mainland to the Territory of Hawaii, the following directions are given:

Under recent date the Federal Bureau of Animal Industry granted to the Territory of Hawaii the privilege of having live stock intended for shipment to this place inspected and tested by officers of the said Bureau. This inspection and testing with mallein or tuberculin will be made either at the port of shipment or at the farm or ranch where the animals are to be purchased. All necessary expenses, including traveling expenses and subsistence of the inspector to and from the place where the test is to be made, must be paid by the party ordering the test. The federal inspectors will also inspect each vessel carrying live stock to this Territory and see to it that the animals are installed on board in such manner as to insure their safe and humane transportation.

Any party desiring to purchase on the Mainland of the United States, horse stock or cattle for shipment to this Territory or any party having purchased such animals should apply to Dr. George S. Baker, Inspector in Charge, Bureau of Animal Industry, 407-8 Postoffice building, San Francisco, California, for inspection and testing. In case the animals are located at a distance from San Francisco, Dr. Baker will send one of his inspectors to make the test or will designate the nearest inspector to whom to apply for testing. Upon arrival of the stock in San Francisco, Dr. Baker should be notified and the test certificates submitted for his approval, unless they have been forwarded to him direct. He should also be informed as to the vessel on which the animals are to be shipped and the date and time of sailing.

The same directions apply as far as inspection is concerned to sheep and swine intended for importation.

The inspector in charge at Portland, Oregon, is Dr. E. C. Joss, room 402 Custom House, and at Seattle, Washington, Dr. O. B. Hess, care of Frye & Bruhn (Inc.).

In Honolulu the office of the Territorial Veterinarian, Dr. Victor A. Nørgaard, is in the building of the Board of Agriculture and Forestry, located in the grounds of the Government Nursery, King and Keeaumoku streets, telephone No. 569. The Assistant Territorial Veterinarian, Dr. Leonard N. Case, has the same office address and telephone number. Either of these two officials should be notified whenever a steamer or other vessel expected to bring live stock is sighted in order that they may be present when the vessel docks.

In the land of independent homes, no one need sit up election night for the final returns.

Where the people have land, the country will have liberty with law.

BY AUTHORITY.

BRUSH FIRES ON TANTALUS.

Notice is hereby given that in accordance with Section 6 of Act 71 of the Session Laws of 1905, it is *forbidden* to start fires for the burning of brush, dry grass, etc., for a period of twelve (12) months from date, within that portion of the District of Kona, Island of Oahu, bounded on the East by Manoa Valley, on the North by the Konahuanui Mountain Ridge, on the West by Nuuanu and Pauoa Valleys (including the forested portion of the ridge above Pacific Heights), and on the South by the makai edge of the Eucalyptus forest, the Makiki Reservoir and the mauka boundary of the Judd land in Makiki and Manoa, *unless* the written permission of the Fire Warden has been first obtained.

The law reads, "such fires shall not be started during a heavy wind without sufficient help present to control the same, and the fire shall be watched by the person setting the same, or by competent agents of his, until put out."

Permits may be obtained from Mr. David Haughs, Deputy Fire Warden at Large, at the Government Nursery, King Street, Honolulu, or by application through David Kapihe, Forest Ranger for Tantalus.

RALPH S. HOSMER,
Chief Fire Warden.

Honolulu, Hawaii, February 17, 1910.



Anyone sending a sketch and description may quickly ascertain our opinion free whether an invention is probably patentable. Communications strictly confidential. **HANDBOOK** on Patents sent free. Oldest agency for securing patents. Patents taken through Munn & Co. receive special notice, without charge, in the

Scientific American.

A handsomely illustrated weekly. Largest circulation of any scientific journal. Terms, \$3 a year; four months, \$1. Sold by all newsdealers.

MUNN & Co. 361 Broadway, New York
Branch Office, 625 F St., Washington, D. C.

Garden and Farm Tools and Implements

To do good farming you must have up to date tools to work with. We carry a most complete line of everything needed by the small or large farmer, from the smallest hand trowel to the largest cane plow. We also have a good assortment of Hand, Bucket or Barrel Sprayers. Our assortment of Hoes, Shovels, Spades, Mattocks, Rakes, Garden Shears, Lawn Mowers, Garden Hose, and other things that are needed daily about the farm or garden, is most complete and our stock large.

E. O. HALL & SON, LTD.

Office: Brewer Building, Queen St.
Works Iwilei,

Telephone 430.
Telephone 272.

The Hawaiian Fertilizer Co., Ltd.

HONOLULU, HAWAII.

MANUFACTURE AND DEAL IN ALL KINDS OF
Fertilizer and Fertilizer Ingredients
INCLUDING :

Bone Meal,	Sulfate Ammonia,
Nitrate Soda,	Sulfate Potash,
Double-Superphosphate,	Dissolved Guano,
Ground Limestone, etc., etc.	

BOARD OF DIRECTORS :

Chas. M. Cooke, President,	E. F. Bishop, Treasurer,
E. D. Tenney, Vice-President,	J. Waterhouse, Secretary,
Geo. H. Robertson, Auditor,	
W. M. Alexander	
C. H. Atherton,	
E. F. Bishop, Managing Director,	
Norman Watins, General Superintendent	

The products of this company are equal in every respect to any fertilizers sold in any market. In none of the conditions are they ranked by those manufactured elsewhere.

We will be pleased to furnish analysis of the soil of any locality in the Territory and make special fertilizers for different soil products arranging the composition to suit conditions.

Prices and Terms on Application.

Board of Agriculture and Forestry.

PUBLICATIONS FOR DISTRIBUTION.

Any one or all of the publications listed below (except those marked *) will be sent to residents of this Territory, free, upon application to Mailing Clerk, P. O. Box 331, Honolulu.

BOARD.

- Report of the Commissioner of Agriculture and Forestry for 1900; 66 pp.
Report of the Commissioner of Agriculture and Forestry for 1902; 88 pp.
* First Report of the Board of Commissioners of Agriculture and Forestry, from July 1, 1903, to December 31, 1904; 170 pp.
Second Report of the Board of Commissioners of Agriculture and Forestry, for the year ending December 31, 1905; 240 pp.; 8 plates; 10 text figures.
Third Report of the Board of Commissioners of Agriculture and Forestry, for the year ending December 31, 1906; 212 pp.; 3 plates; 4 maps; 7 text figures.
Fourth Report of the Board of Commissioners of Agriculture and Forestry, for the calendar year ending December 31, 1907; 202 pp.; 7 plates.
Fifth Report of the Board of Commissioners of Agriculture and Forestry, for the calendar year ending December 31, 1908; 218 pp.; 34 plates.
"Notice to Importers," by H. E. Cooper; 4 p.; 1903.
"Digest of the Statutes Relating to Importation, Soils, Plants, Fruits, Vegetables, etc., into the Territory of Hawaii." General Circular No. 1; 6 pp.
"Important Notice to Ship Owners, Fruit Importers and Others. Rules and regulations Prohibiting the Introduction of Certain Pests and Animals into the Territory of Hawaii." General Circular No. 2; 3 pp.; 1904.
"Law and Regulations, Importation and Inspection of Honey Bees and Honey." General Circular No. 3; 7 pp.; 1908.
"The Hawaiian Forester and Agriculturist," a monthly magazine. Vols. I to VI; 1904-1909. To be obtained from the Hawaiian Gazette Co., Honolulu. Price \$1 a year.

DIVISION ON ENTOMOLOGY.

- "The Leaf-Hopper of the Sugar-Cane," by B. C. L. Perkins. Bulletin No. 1; 38 pp.; 1903.
** "A Catalogue of the Hemipterous Family Aleyrodidae," by G. W. Kirkaldy, and "Aleyrodidae of Hawaii and Fiji with Descriptions of New Species," by Jacob Kotinsky. Bulletin No. 2; 102 pp.; 1 plate; 1907.
* "On Some Diseases of Cane Specially Considered in Relation to the Leaf-Hopper Pest and to the Stripping of Cane," by B. C. L. Perkins. Press Bulletin No. 1; 4 pp.; 1904.
"A Circular of Information," by Jacob Kotinsky. Circular No. 1; 8 pp.; 1905.
"The Japanese Beetle Fungus," by Jacob Kotinsky and B. M. Newell. Circular No. 2; 4 pp., cut; 1905.
Report of the Division of Entomology, for the year ending December 31, 1905. Reprint from Second Report of the Board; 68 pp.; 3 plates; 10 text figures.
Report of the Division of Entomology, for the year ending December 31, 1906. Reprint from Third Report of the Board; 25 pp.; 7 text figures.
Report of the Division of Entomology, for the year ending December 31, 1907. Reprint from Fourth Report of the Board; 18 pp.; 1 plate.
Report of the Division of Entomology, for the year ending December 31, 1908. Reprint from Fifth Report of the Board; 26 pp.; 2 plates.

DIVISION OF FORESTRY.

- * "Forest and Ornamental Tree Seed for Sale at Government Nursery." Press Bulletin No. 1; 3 pp.; 1905.
* "Suggestions in Regard to the Arbor Day Tree Planting Contest." Press Bulletin No. 2; 7 pp.; 1905.
"An Offer of Practical Assistance to Tree Planters." Circular No. 1; 6 pp.; 1905.
"Revised List of Forest and Ornamental Tree Seed for Sale at the Government Nursery." Press Bulletin No. 3; 4 pp.; 1906.
* Instructions for Propagating and Planting Forest Trees." Press Bulletin No. 4; 4 pp.; 1906.
"Instructions for Planting Forest, Shade and Ornamental Trees." Press Bulletin No. 5; 7 pp.; 1909.
"Na Hoakaka no ke Kanu Ana i na Laau Malumalu ame na Laau Hoohiwahiwa." Press Bulletin No. 6; 8 pp.; 1909.
Report of the Division of Forestry, for the year ending December 31, 1905. Reprint from Second Report of the Board; 77 pp.; 5 plates.
* Report of the Division of Forestry, for the year ending December 31, 1906. Reprint from Third Report of the Board; 123 pp.; 4 maps.
Report of the Division of Forestry, for the year ending December 31, 1907. Reprint from Fourth Report of the Board; 70 pp.
Report of the Division of Forestry, for the year ending December 31, 1908. Reprint from Fifth Report of the Board; 85 pp.

** This Bulletin will be sent only to persons interested in the subject.

* Out of Print.

Board of Agriculture and Forestry.

PUBLICATIONS FOR DISTRIBUTION—Continued.

DIVISION OF ANIMAL INDUSTRY.

- * "Inspection of Imported Live Stock." Rule 1; 1 p.; 1905.
 - * "Inspection and Testing of Imported Live Stock for Glanders and Tuberculosis." Rule 2; 1 p.; 1905.
 - * "Concerning Glandered Horse Stock in the Territory." Rule 3; 1 p.; 1905.
 - * "To Amend Rule 1, Inspection of Imported Live Stock." Rule 4; 1 p.; 1907.
 - * "Rules and Regulations, Inspection and Testing of Live Stock." Rules and Laws; 11 pp.; Revised; 1910.
 - * "Quarantine of Horse Stock from California." Rule 8; 1 p.; 1908.
 - Report of the Division of Animal Industry, for the year ending December 31, 1905. Reprint from Second Report of the Board; 62 pp.
 - Report of the Division of Animal Industry, for the year ending December 31, 1906. Reprint from Third Report of the Board; 41 pp.; 3 plates.
 - Report of the Division of Animal Industry, for the year ending December 31, 1907. Reprint from Fourth Report of the Board; 104 pp.; 6 plates.
 - Report of the Division of Animal Industry, for the year ending December 31, 1908. Reprint from Fifth Report of the Board; 44 pp.
-

DIVISION OF FORESTRY.

FOREST AND ORNAMENTAL TREE SEED AND SEEDLINGS FOR SALE AT THE GOVERNMENT NURSERY.

The Division of Forestry keeps constantly on hand at the Government Nursery, seed and seedlings of the important native and introduced trees. These are sold at prices just covering the cost of collection or growing.

The list includes both forest and ornamental trees, such as Silk Oak, Koa, various species of Eucalyptus, Golden and Pink Showers, Pride of India, Poinciana, Albizzia, etc. The price of the seed varies from 10 to 50 cents per ounce. The seedlings may be had for 2½ cents each, except a few kinds which are 5 cents. Seed of the various palms is also for sale; the price per 100 varying from \$1.00 to \$2.50. All seed is tested before being sent out, which insures its being good.

All communications in regard to seed or trees should be addressed to David Haughs, Forest Nurseryman, Box 331, Honolulu, Hawaii.

RALPH S. HOSMER,
Superintendent of Forestry.

DIVISION OF ENTOMOLOGY.

To give information about insects free of charge is one of the duties of this Division and Hawaiian readers are hereby invited to make inquiry in person and by mail. In order to be able to advise intelligently or send the right kind of useful insects for relief we like and sometimes it is indispensable for us to see the insect suspected or caught in the act, also specimens of the injury. In a tin with a hole or two, or a wooden box specimens may be mailed at 3rd class rates. When specimens are not accompanied by letter *always* write your name and address in the upper left-hand corner of the package. Address all communications SUPERINTENDENT DIVISION OF ENTOMOLOGY, P. O. BOX 331, HONOLULU, HAWAII.

EDW. M. EHRHORN,
Superintendent.

VOL. VII

MARCH, 1910

No. 3

Price, 10c. Per Copy; Per Annum, \$1.00; Foreign, \$1.25.

THE
Hawaiian Forester
AND
Agriculturist

A MONTHLY MAGAZINE

OF

Forestry, Entomology and Agriculture

ISSUED UNDER THE DIRECTION

OF THE

BOARD OF COMMISSIONERS OF AGRICULTURE
AND FORESTRY.

PUBLISHED MONTHLY.

Entered as second-class matter at the Post office, at Honolulu, Hawaifi.

ADDRESS ALL COMMUNICATIONS TO

DANIEL LOGAN,
EDITOR "THE FORESTER,"

P. O. BOX 366,
HONOLULU, H. T.

For business relating to advertising or subscriptions, address

HAWAIIAN GAZETTE CO., LTD., Publishers,
VON HOLT BLOCK, 65 S. KING ST., HONOLULU, HAWAII.

CONTENTS:

	Page
Editorial.....	67
Board of Commissioners.....	70
Division of Animal Industry.....	73
Division of Entomology.....	78
Division of Forestry.....	80
Public Lands Department.....	81
Hawaiian Poultry Association.....	82
Coöperation (Dr. Wilcox).....	82

OFFICERS AND STAFF OF THE BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY.

COMMISSIONERS.

Marston Campbell, *President and Executive Officer.*
J. M. Dowsett P. R. Isenberg
H. M. von Holt

DIVISION OF FORESTRY.

Ralph S. Hosmer, *Superintendent of Forestry and Chief Fire Warden.*
David Haughs, *Forest Nurseryman.*
Joseph F. Rock, *Botanical Assistant.*
Louis Margolin, *Forest Inspector.*
David Kapihe, *Forest Ranger for Tantalus.*

DIVISION OF ENTOMOLOGY.

Edward M. Ehrhorn, *Superintendent of Entomology and Chief Inspector.*
 Albert Koebele, *Consulting Entomologist.*
 *Assistant Entomologist.*
 D. B. Kuhns, *Inspector's Assistant.*
 Louis Lewis, *Assistant in Inspection.*
 Fred Muir, *Beneficial-Insect Collector.*
 Bro. M. Newell, *Fruit and Plant Inspector, Hilo, Hawaii.*
 Robert R. Elgin, }
 W. O. Aiken, } *Honorary Fruit* { *Mahukona, Hawaii.*
 W. D. McBryde, } *and Plant Inspector* { *Kahului, Maui.*
 Dr. W. B. Deas, } *at* { *Koloa, Kauai.*
 Wm. Robb, } { *Hana, Maui.*
 { *Lahaina, Maui.*

DIVISION OF ANIMAL INDUSTRY.

Victor A. Nørgaard, *Superintendent of Animal Industry and Territorial Veterinarian.*
L. N. Case, *Assistant Territorial Veterinarian.*
John Vanhuizen, *Live Stock Inspector.*
J. C. Fitzgerald, *Deputy Territorial Veterinarian for Maui.*
H. B. Elliot, *Deputy Territorial Veterinarian for Hawaii.*
A. R. Glazoyer, *Deputy Territorial Veterinarian for Kauai.*

CLERKS AND STENOGRAPHERS.

Miss Melika Peterson, Miss E. M. Kuhn

EDITOR OF THE "FORESTER,"

Daniel Logan

LIBRARIAN

Miss Ella K. Dayton

THE HAWAIIAN FORESTER AGRICULTURIST

VOL. VII

MARCH, 1910

No. 3

COTTON GIVES GOOD PROMISE.

From all appearances there is not one of the new industries set on foot in recent years which gives brighter promise of established success than cotton growing. In a recent interview, Dr. Wilcox, director of the Hawaii Experiment Station, gave out some facts regarding plantings of cotton upon different islands of the group, which are highly encouraging. Among other things he said:

"At Dr. Raymond's place on Maui about 100 acres have been planted to cotton. It is coming along finely and I feel certain will show highly satisfactory results.

"On Kauai at the Gay and Robinson place 75 acres have been planted long enough to prove that cotton on a large scale can be made an exceedingly profitable crop in the Islands. It is all doing finely. The yield for the first pickings of Caravonica has turned out about 750 pounds of seed cotton, or 300 pounds of lint, to the acre. From now on the yield will increase with each season until the trees are fully matured.

"I feel highly encouraged with results obtained thus far, and believe that before the present year is over we will be able to place before the public demonstrated facts concerning an industry of the highest commercial importance in these Islands.

"Our experiments have been slow for the reason that difficulties had to be overcome and some of the theories we are working out are entirely new. However, the results promise to more than compensate for the time and expense of the experiments."

In the same issue of the newspaper containing Dr. Wilcox's remarks above quoted, there is another news story about cotton in which its writer, after making some observations on the possibility that "cotton may yet be king of Hawaii, usurping the place long held by sugar," proceeds to say:

"It has remained for the Island of Kauai to furnish the first instance of cotton supplanting sugar upon ground before occupied by sugar. Sugar cane land there has actually been plowed

up and planted in cotton. Gay & Robinson have done it in the past year and are doing more of it this year. This is because they believe they can derive more profit from cotton than from sugar. Last year in March they planted 25 acres of land, until then for years in sugar, in cotton. The location is only a few hundred yards from Makaweli sugar mill. There was a rainfall in April but scarcely any rain since, yet without irrigation the cotton bushes are today eight feet high and heavily laden with pods.

"Gay & Robinson have picked about two and a half tons of cotton from the field. They expect the trees will yield one ton to the acre at maturity. With Japanese women employed as pickers at forty cents a day, the cost has been less than one-half cent a pound. This is cheaper than cotton-picking in the Southern States, yet with experience the Japanese women will probably make a still lower record.

"This year Gay & Robinson are going to plow up 30 acres more of sugar cane land and plant it in cotton."

COÖPERATION.

In the initial year of this magazine much advocacy was given to the cause of coöperation of fruit raisers of these islands. It was advocated as the one means of making the most both of the local and the mainland markets. Coöperation in the first place brings about methods of preparing the products so as to give the highest possible marketable value to them. On this score it establishes a standard by which the fruits of a given district will have a selling name and fame. By coöperating in an extensive advertising campaign, the larger pineapple raisers and canners of Hawaii have created a name to conjure with, which can only be injured through the slackening of standards by any of the concerns exporting our pines. There will be no danger of this if the companies combining for publicity are bound to each other likewise for excellence of output. Then the individual brand will not matter—if it's Hawaiian, enough said. Beyond this advertising enterprise of the Hawaiian Pineapple Growers' Association, there does not occur to mind any instance of the co-operation for market exploitation at that former period advocated. Since then a considerable number of homesteads have been taken up on these islands, and the variety of products raised on small farms here has been increased.

For every staple that is likely to have a large production, there ought to be an association for the purpose of fixing export standards and systematically marketing the output. Cotton, tobacco and rubber are articles that might properly be handled indi-

vidually. No doubt the Hawaiian Rubber Growers' Association, already in vigorous existence, will in due time attend to all matters of grading and marketing of that promising staple. There was a coffee organization at one time, but too little has been heard of it in late years. Hawaiian coffee has an excellent reputation, but there is ground of fearing that it has been too much subordinated to the rank of an article for blending with other coffees. How far this may be the case with our coffee packed here under distinct brands it would be hard to say. If, however, the trade will have our coffee mainly as a blend, then it is important that it reach the blending houses in the best of quality and condition.

For raw fruits of various kinds, which are subject to handling by merchants in that general line, one organization ought to suffice for all. There would seem to be nothing among the possibilities of great expectations in Hawaii which has been more disappointing thus far than the raw fruit export. This should not have been so, for other countries within trading distance of the American market have made fruit spell prosperity. While the unsatisfactory transportation for this item has had much to do with the stalling of progress, there is no less certainty that the lack of organization to look after selection, packing, carrying and marketing has been the chief drawback.

This is a subject that ought to be taken up collectively by the small farmers and homesteaders throughout the Territory. What has immediately suggested the foregoing remarks is a recent magazine article showing great benefits gained from coöperation, although not so well carried out as might have been, by the grape growers of Michigan.

Since the foregoing remarks were written, a series of articles on the subject of coöperation of our agriculturists, by Dr. Wilcox, director of the Hawaii Experiment Station, have been printed in the Advertiser. Coming from such an authority, they are deemed highly appropriate for preservation in convenient form in these pages. Therefore they are reprinted in this number of THE FORESTER.

An article on bee-keeping in Hawaii is promised for an early number by one of the most successful apiarists in the islands.

It will be pleasing to people engaged in any branch of agricultural industry in this Territory to hear that the Hawaiian Poultry Association intends to make its next annual show a general exhibition of Hawaiian products. Hawaii is able to interest her own people and visitors in many things besides volcanoes, scenery, floral parades and high jinks.

Japanese cultivators in Palolo Valley are peddling very excellent articles of potatoes, beets, cabbage, carrots, etc., from door to door in the Waialae suburbs. Honolulu should not require to import any garden truck.

Inspector Newell's remarks about bad potatoes will be appreciated by many a housekeeper in Hawaii. There is perhaps not another article of food with which households are more commonly swindled—done out of hard-earned money for worse than negative value. Pure food laws when enforced are among the greatest of present day boons, and faithful inspection of provisions, such as will bar unfit goods from market, is more important even than the detection of adulterated and unsound specimens in stocks already under retail disposal. The vileness of a tainted potato, like that of a bad egg, may be discovered only when it is too late to return the goods and make the seller bear the loss. And he ought to bear the loss, any retailer who will allow a producer or a middleman to impose unfit goods upon him more than once.

BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY.

A meeting of the Board of Commissioners of Agriculture and Forestry was held at the office of the Superintendent of Public Works, in the Capitol building, on Monday, March 14, at 2 p. m. Present: Mr. Marston Campbell, president and executive officer, Messrs. D. P. R. Isenberg and J. M. Dowsett, members.

Mr. Campbell stated that the survey and map of the Pupukea-Paumalu forest reserve was being prepared for submission to the Governor.

Kohala Forest Reserve.

President Campbell reported that the plantation interests in Kohala have succeeded in getting together the sum of \$24,250. Under the appraisement made of Kehena II, the land was placed at \$10.00 per acre. The opinion of the Board, when the Kohala forest matter first came up, was that the Government should secure all of the lands free of any encumbrances or any additional payment by the Government. The condition now is that it is impossible to do that. He said he had discussed this matter with Governor Frear. Mr. Campbell's suggestion was that the Board accept the tender of \$24,250 by the plantation interests of Kohala toward the acquirement of the land of Kehena II. If satisfactory arrangement cannot be made with the Woods Estate and they refuse settlement on the basis of \$10.00 per acre, the president said he would request of the Board that the Superintendent of Public Works be instructed to enter condemnation proceedings,

or compromise with the Woods Estate; that is, the Government to make up the difference, which might be required on the judgment of the court, from the sale of Government land under Act 55 of the last legislature, or by compromise with the Woods interests, by giving them in addition to the \$24,250, if the same is necessary, a small portion of the lands lying mauka, which are now unleased, with the further understanding that all rights of the Woods estate and others, in the lands, be turned over free of any encumbrances whatsoever. It has been a struggle to get the plantation interests together and they had accomplished something in getting them at least to raise the amount.

Mr. Campbell further stated that Mr. T. Clive Davies informed him that T. H. Davies & Company are trustees for that fund and that he would notify the Board when the money is ready under these restrictions.

Mr. Dowsett inquired if the money for the purchase of these lands had been virtually contributed.

Mr. Campbell replied that it had been made available to him, and that for negotiations the Board would be the medium. The planters had made no attempt to negotiate but had placed the funds at the Board's disposal with certain restrictions, with the right to close the transaction.

Mr. Dowsett moved that when the amount of \$24,000 is made available for this purpose, the Board be authorized to enter into negotiations with the Woods Estate with a view to acquiring the desired area of Kehena II, or in addition thereto by exchange of Government lands which will be available for the purpose, or, failing in this, that the Superintendent of Public Works report back with such recommendations as he sees fit for the acquiring of the lands in some other way. Carried.

Entomology.

Mr. Ehrhorn, the Superintendent of Entomology, was present at this meeting and stated that he had received a shipment of 150,000 Aphis-eating ladybugs from California, an account of the distribution of which will appear in his next report. As conditions in Hawaii are entirely different from those in California he said that he had endeavored to liberate the ladybugs in such a way that they might find as congenial habitat here as they do in California. The ladybug was introduced a number of years ago, but in such small quantities that they were unsuccessful in establishing themselves at that time. The new method of liberating many thousands in each locality will prove whether this species will ever be able to establish itself. These ladybugs readily take hold of the Aphis as soon as liberated. A small quantity was placed in an enclosed fernery where the fern Aphis was very abundant and inside of a few hours had reduced the pest considerably.

With reference to the purchase of a horse by the Superintendent of Entomology, it was moved and seconded that he be granted permission to do so.

Animal Industry.

Mr. Isenberg stated that with regard to the transportation of animals there seemed to be absolutely no complaint. He had talked with several ranchmen and all seemed to be satisfied. He voted that all action in regard to the enforcing of the rules and regulations pertaining thereto be postponed until such time as further dissatisfaction is expressed.

Circular letter, calling attention to the rules of the Board of Agriculture, relating to the inspection and testing of livestock intended for importation into the Territory, submitted by Dr. V. A. Norgaard, was approved, and it was voted that copies of same with pamphlets of the rules and regulations be sent, for distribution, to the agents of the various steamship lines.

Routine Reports.

It was voted that the regular monthly report of the Superintendent of Entomology and that of the Superintendent of Animal Industry be accepted and placed on file; the same action was taken with regard to the report of the Forest Nurseryman. In the absence of the Superintendent of Forestry on Maui, no regular report was submitted by him.

Finance.

The President read the minutes of the meeting of the Board of Apportionment, of March 7, to determine the expenditure of the one-fourth of the special fund provided for by Act 33 of the Laws of 1909.

At this meeting it was resolved that the action of the Board taken on August 6, 1909, authorizing the expenditures of certain amounts for the Board of Agriculture and Forestry in accordance with Act 87 of the Laws of 1909 be rescinded; that the sum of \$3,500 per month, beginning January 1, 1910, be allotted and authorized to be expended out of the proceeds of the one-fourth of the special fund provided for by Act 33 of the Laws of 1909 for the uses and purposes of the Board of Agriculture and Forestry; that there be allotted and authorized to be expended out of the proceeds of the one-fourth of the special fund provided for by Act 33 of the Laws of 1909 for the use of the Board of Agriculture and Forestry in planting and fencing the Pupukea-forest reserve and the Pupukea-Paumalu water reserves, the sum of \$3,500.00; also that there be allotted and authorized out of the proceeds of the one-fourth of the special fund provided for by Act 33 of the Laws of 1909 for the use of the Board of

Agriculture and Forestry in planting and fencing the Kohala forest reserve, the sum of \$20,000.00, this amount to be available December 1, 1910.

Those present at this special meeting were J. P. Cooke, chairman of the Board, and Messrs. Marston Campbell and E. V. Wilcox, members.

Communications.

The President of the Board of Agriculture and Forestry read a letter to E. H. Wodehouse, trustee of the Wight Estate, under date of February 21, 1910, in regard to the endeavor to secure certain lands in the district of Kohala for a part of the Kohala forest reserve; a portion of the lands desired being the lands of Kehena II, owned by the Woods Estate. The plan outlined is that the Board of Agriculture and Forestry expend the sum of \$25,000 in fencing and reforestation of the Kohala forest reserve, provided that the interests directly benefited by the Kohala forest reserve contribute toward the securing of the lands of Kehena II.

DIVISION OF ANIMAL INDUSTRY.

Honolulu, Hawaii, February 9, 1910.

Hon. Marston Campbell, President and Executive Officer,
Board of Agriculture and Forestry, Honolulu.

Sir:—I beg to report on the work of the Division of Animal Industry since the last meeting of this Board, on January 4th.

Glanders.

The Live Stock Inspector, Mr. Vanhuizen, has patrolled the following districts inspecting all horses and reporting all suspicious cases to this office, as follows:

Moiliili District	4	times
Manoa District	2	"
Palolo District	2	"
Kapahulu and Waikiki Districts.....	3	"
Kewalo District	5	"
Kalihi District	4	"
Kalihi Valley	1	"
Moanalua	2	"
Puuloa .. .	1	"
Nuuanu and Puunui Districts.....	2	"
Pauoa District	1	"

All streets in the business section of the city are regularly patrolled and all stables, feed yards and trader's quarters closely inspected.

A general inspection was made January 6 and 7 of Aiea, Pearl City, Waipahu and Ewa districts, including all plantation camps and adjacent rice fields, etc.

There are now five suspect animals being watched for further development of symptoms.

On January 21st (S. S. Alameda, Jan. 7) a sorrel horse owned by Jerry Broderick and which was brought from the coast without papers, was subjected to the Mallein test at the Quarantine Station. It gave a negative reaction and was turned over to the owner.

On January 26th we received at the laboratory from Mr. McVeigh a portion of a gland which he had taken from the head of a steer. From his description of the location it was evidently a portion of the sub-maxillary gland. Mr. McVeigh sent the gland to the laboratory from the Molokai Leper Settlement and wished the examination made as he feared the animal might be suffering from lumpy jaw. The examination of a number of scrapings made from different parts of the gland failed to disclose any signs of Actinomyces.

On January 27th a sorrel horse owned by Mr. Blackman and which was formerly owned by one John Pottie, was taken to the Quarantine Station for testing as requested by Mr. Blackman.

When the horse was first brought to us for examination there was a profuse discharge from both nostrils, heavily swollen glands, one of which was discharging slightly. The character of the glandular swelling and the appearance and nature of the nasal discharge strongly indicated Strangles, which was the diagnosis turned in to the owner.

About four or five days after Mr. Blackman called me to see the horse which I found very much improved and which I thought ought to be cured inside of two weeks. A week after, as Mr. Blackman wished the horse tested it was taken to the Quarantine Station and the test applied. The glands were still somewhat swollen, but the nasal discharge had entirely disappeared.

The results of the test are rather uncertain for although the temperature reached as high as 105.1 the reaction was not typical either as regards temperature or local reaction. The horse will be kept for further study.

Milk Ordinance.

The Board of Supervisors, represented by Mr. Logan, has conferred with the Division of Animal Industry, represented by Mr. Isenberg and Mr. von Holt, in regard to the adoption of the ordinance, for the purpose of controlling the sale and distribution of milk in the City and County of Honolulu. This ordinance, which it is believed will be satisfactory to everybody concerned, has been submitted to the Board of Supervisors, and

the Board of Agriculture and Forestry has promised its support in so far as the testing of dairy cattle is concerned, the Board of Supervisors promising to provide the means for a compensation of live stock inspectors to assist in this work.

Regulation Concerning the Inspection of Live Stock in Inter-Island Traffic.

Pursuant to a note from the President of this Board a meeting of the Committee on Animal Industry was held in the office of Mr. Isenberg on February 1. The principal cattlemen in town were notified that a public meeting was to be held at the office of the Board of Agriculture and Forestry, at 8 o'clock that same evening, but owing to the fact that the president of the Hawaii Meat Company, Mr. A. W. Carter, expressed himself as satisfied with the service obtained from the steamship company carrying the majority of live stock over to Honolulu for slaughter, the meeting was but scantily attended and no action was taken. It is held by Mr. Carter that until complaint is made by the shippers of live stock there is no cause for this Board to take any action in the matter, even though the recent statute of the last Legislature requires that rules and regulations be made by this Board for the purpose of governing the shipment of live stock between and on the various islands. The Territorial Veterinarian would like further instructions from the Board as regards this question.

Importation of Live Stock.

Since the last report the following live stock has arrived from the mainland:

- January 6—S. S. Moana: 1 monkey, 1 cat, 4 crates chickens.
- January 7—S. S. Alameda: 3 dogs, 1 horse, 5 crates chickens.
- January 13—S. S. Lurline: 1 horse, 3 crates chickens, 3 pigs.
- January 13—S. S. Korea: 2 dogs.
- January 14—S. S. China: 2 crates Japanese game.
- January 15—Sp. H. Hackfeld: 2 dogs.
- January 20—S. S. Hilonian: 15 cattle (Devons), 4 cows, 1 horse.
- January 28—S. S. Chiyo Maru: 1 crate Game chickens.
- January 29—S. S. Alameda: 2 crates chickens.
- January 30—S. S. Siberia: 1 dog.
- February 4—S. S. Asia: 1 crate geese.
- February 8—S. S. Lurline: 20 mules, 2 cats, 6 crates chickens.

Very respectfully,

VICTOR A. NORGAARD,
Territorial Veterinarian.

REPORT FOR FEBRUARY.

Honolulu, Hawaii, March 14, 1910.

Hon. Marston Campbell, President and Executive Officer, Board of Agriculture and Forestry, Honolulu.

Sir:—I beg to report on the work of this Division since the last meeting of the Board on February 9, as follows:

Inspection Service.

The Inspectors of this Division have had considerable difficulty in enforcing the rules and regulations of the Board pertaining to the importation of live stock, and I have therefore prepared a letter for your approval and which I would recommend be sent to the agents or representatives of the various steamship and sailing vessel companies at the principal ports of importation.

In this connection I would mention as an instance that the steamship Tenyo Maru arrived on February 25 and was boarded by myself. While I remained on board for nearly an hour and made inquiries from the purser, first officer and baggage master, I failed to locate any animals on board. The following day at 10 o'clock I was summoned to the Quarantine Station in order to inspect a crate of Japanese game chickens which had arrived on the Tenyo Maru the previous day. At 2 o'clock the same afternoon I was called on the phone from Quarantine Island saying that there was one dog and two crates of chickens to be inspected and that a boat would be at the foot of Fort street to carry me over.

The appended correspondence from Dr. Elliot in regard to a horse which arrived on the steamship Enterprise at Hilo without having been submitted to the mallein test indicates that in this case the steamship company was not to blame as the boat was cleared by Dr. Baker. But in order to avoid a repetition of this case I have urged in the circular letter submitted for your approval that the commanding officers of all vessels carrying live stock to this Territory be instructed to refuse to accept the same unless accompanied by the requisite certificates of inspection and testing.

The following live stock has arrived since the last report:

Feb. 14, S. S. Manchuria—1 dog.

Feb. 17, S. S. Mongolia—1 cat.

Feb. 18, S. S. Alameda—1 horse, 2 crates poultry.

Feb. 25, S. S. Tenyo Maru—1 crate Japanese games, 1 dog, 2 crates chickens.

Feb. 27, S. S. Arizonan—23 head cattle, 1 jack.

March 7, S. S. Korea—1 dog, 20 chickens, 3 pigs, 2 pigeons.

March 9, S. S. Lurline—29 mules (19 for Kahului).

March 12, S. S. Alameda—1 crate chickens.

The 23 head of cattle which arrived on the Arizonian on February 27 consisted of 15 head of Hereford bulls for the Raymond Ranch, 1 Kerry bull for Mr. Isenberg, and 5 milch cows.

Of the 29 mules which arrived on the Lurline on March 9, ten were for the Schuman Carriage Company and were placed in quarantine on the Beach Road, while 19 were for Alexander & Baldwin, Maui. A wireless message notifying Dr. Fitzgerald of the arrival of these mules was forwarded immediately in order to allow him to prepare for the quarantine.

Glanders.

Since my last report the following districts have been inspected by Mr. Venhuizen, as follows:

Kalihi District, five times; Nuuanu Valley and Puunui District, twice; Waikiki District, four times; Kewalo District, five times; Manoa Valley, twice; Pauoa Valley, twice; Moiliili District, three times; Palolo Valley, once; Moanalua and vicinity, once; Makiki District and Punchbowl Slope, three times; Waialae and Ni'u, once.

Ten suspicious cases were found, four of which were taken to the Quarantine Station and submitted to the mallein testing. One of these animals was found to suffer from typical glanders and was destroyed. The stable where this horse had been kept was submitted to a thorough disinfecting and white washing. It is noteworthy that this animal as well as the one reported on at the last meeting have been patients in the stable of Dr. Pottie, but as he has left the Territory for good no action can be taken in the matter.

All livery, dray and contract stables have been inspected once a week. All streets in the business section of the city have been patrolled as often as possible.

One tour of inspection has been made through Aiea, Pearl City and Waipahu.

Three days were spent in disinfecting stables.

Cruelty to Animals.

I have several times of late been consulted by the humane officer as well as by the hack inspector in regard to cases of cruelty to animals, notably among which was a case of a broken leg in a horse which the owner refused to have killed. After consulting the Attorney General as well as several prominent lawyers on the subject, I came to the conclusion that the laws of the Territory on this subject are insufficient to allow of any action to be taken in the matter as long as the owner does not neglect the animal in question.

Eye Worms in Chickens (Filiaria mansoni).

This disease which seems to be quite prevalent here consists in the presence of worms in the eye between the eyeball and the socket. As many as 50 of these minute worms have been removed from a single eye in spite of which the affected chicken seems to suffer very little inconvenience. The disease has been fully investigated by Dr. Case, who has found that it yields readily to treatment and who is endeavoring to get at the life history of the parasite in question. The subject will be discussed in full in the next annual report.

VICTOR A. NORGAARD,
Territorial Veterinarian.

DIVISION OF ENTOMOLOGY.

Honolulu, Hawaii, March 1, 1910.

Honorable Board of Commissioners of Agriculture and Forestry,
Honolulu.

Gentlemen:—I respectfully submit my report of the work of the Division of Entomology for the month of February:

Of 25 vessels boarded we found fruit, plants and vegetables on 18. All shipments received the usual rigid inspection and were disposed of as follows:

<i>Disposal with Principal Causes.</i>	<i>Lots.</i>	<i>Parcels.</i>
Passed as free from pests.....	480	11,155
Fumigated before releasing	20	49
Burned	5	11
Total	505	11,215

Pests which were intercepted during this month were: Thrips on orange trees from Hongkong; Aphis on raspberry plants from California; Cladosporium citri on Tangerines from Yokohama; a scale insect (*Diaspis zamiae*) on Cycas revoluta from Japan; Mites on pine tree from Japan.

Bro. M. Newell, Inspector at Hilo, reports as follows for the month of February:

Hilo, Hawaii, Feb. 28, 1910.

Mr. E. M. Ehrhorn, Supt. Entomological Inspection, Honolulu.

Dear Mr. Ehrhorn:—The following is an account of the inspection for February:

Six foreign vessels arrived in Hilo Bay. There were 101 lots and 1651 parcels. Only a small lot of potatoes were not up to the mark. Everything else being in good condition was passed.

I am holding my own against the importation of dirty potatoes, if for no other reason than for the consumer's sake. People have to pay a good price for the articles and should receive their money's worth. Dirt on potatoes seems to cover a "multitude of sins"—hiding scab and rot. It is surprising sometimes to see how many potatoes have to be thrown away when it comes to the cleaning process. By ordering this to proceed, at least the consumers buy less *rot*.

Yours truly,

B. M. NEWELL,
Inspector.

My attempt to secure a large consignment of Aphis eating ladybugs from California was a success, for on February 18 I received a large ventilated box with about 24,400 Hippodamia convergens which were sent to me by Mr. E. K. Carnes, Superintendent of the State Insectary of the State Commission of Horticulture of California, and were delivered to me personally by Mr. George Compere, who happened to pass through here on his way to the Orient. The insects were in very good condition and of the large number only about 1500 had died on the way. This ladybug has been introduced here before, but as far as search has been made has never been found. As I understand from those who ought to know the numbers sent were in small lots and I therefore undertook the matter of making a large trial and liberating thousands in one place. I have asked for another sending of same size and hope to get these in as good condition. My idea is to liberate these in the same localities so as to reinforce those already in the field.

The ladybugs were distributed as follows: Pauoa 3000, Wahiawa 3000, Kauai 3000, Waialae 3000, and Manoa 11,000. The liberation of the large quantity in this last place was for the purpose of allowing the flight up this valley to the top of the mountains, should the insects care to follow their California habits. The bad weather and uncertainty of localities on the other islands than Kauai did not permit the distribution of them from this lot. However, should the introduction prove successful, it would be a very easy matter to secure large quantities in the future.

I have also been successful in introducing the parasite of the cabbage butterfly, *Pteromalus puparum*, which reduces this pest in California. The damage done to cabbage and other plants in the islands by the cabbage worm is very serious, so much so that many have given up the idea of growing cabbages for market, and we import about 1000 crates annually. The pest is also found attacking turnips, and everywhere the Nasturtium (Tro-

paecolum) is badly attacked. If this parasite will do as well here as it does in California, we shall reduce the pest very considerably.

Very truly yours,

EDW. M. EHRHORN,

Superintendent of Entomology.

DIVISION OF FORESTRY.

R. S. Hosmer, Esq., Superintendent of Forestry, Honolulu, T. H..

Dear Sir:—The following report gives the principal work done during the month of February:

Nursery.

Plants sold, in transplant boxes and pots.....	812
Plants sold, in seed boxes.....	1000
	<hr/>
	1812
Given gratis, in transplant boxes and pots.....	754

The sum of \$82.80 was collected for plants and \$4.70 for seed sold, total \$87.50.

The County Supervisors have asked for 3,000 Ironwood trees (*Casuarina equisetifolia*) to be sent to the Waialua Road Board. Fifteen hundred will be forwarded in the early part of March and the balance about a month later.

Seed Collecting.

The two seed boys have been collecting seed of the different Cassias, this being the only time during the year that good seed of such trees as the Golden shower, Pink and White shower, and Pink shower can be got. Owing to a beetle that bores into the seed of these Cassias just as they are getting ripe a careful watch has to be kept so that enough good seed can be procured before the beetle has a chance to destroy it. The seed is collected, stored and kept secure from the borer, some in the pod and some in the small seed enclosures surrounding the seed. When required the seed is separated; this takes quite a little time and only enough is separated to meet the demand. By the time the new seed comes in the old seed is useless and is thrown away. It can be seen from the above that it is impossible to give a correct statement each month of the amount of good seed that is collected. We cannot tell what amount of good seed there is in the pods until separated. We could weigh or count the pods or seed vessels as they come

in, but that I think would be useless work. About one-third of all the seed collected has to be thrown away owing to the loss of vitality, still we have to keep it on hand as we do not know the amount that may be wanted and at times we run short of certain species.

Experiment Garden, Makiki.

A shed was built over the soil sterilizer, also a propagating house 18 feet by 38 feet has been completed with the exception of the green staining. The shed and propagating house were both built from lumber that was saved from the Nursery fence and part of the quarters at the Nuuanu Station and the old stable at the Forester's cottage on Tantalus.

Other work such as transplanting and potting plants has constituted the principal work.

Nuuanu Station.

The man at the Station has been trimming the trees at the different dangerous curves along the road so that people may have a better chance to see other vehicles and avoid accidents. Clearing away brush and vines from the trees has also been done.

Respectfully yours,

DAVID HAUGHS,
Forest Nurseryman.

March 14, 1910.

PUBLIC LANDS DEPARTMENT.

Marston Campbell, Commissioner of Public Lands, reports to E. A. Mott-Smith, Secretary of Hawaii, the following disposition of public lands during the month ending February 28, 1910:

General Leases.

Feb. 14. Union Mill Co., Ltd., purchaser. Location, Kaauhuhu, North Kohala, Hawaii; area, 54 acres; term, fifteen years; annual rental, \$108.

Feb. 16. Sing Chong & Co., purchaser. Location, Kauhilahau and Honokawailani, Ewa, Oahu; area, 11.41 acres; term, ten years; annual rental, \$128.

Feb. 21. L. L. McCandless, purchaser. Location, Makua, Kahanaiki, and one-half Awalua, Waianae, Oahu; area, 1914 acres; term, 10 years; annual rental, \$451.

Feb. 21. A. S. Wilcox, purchaser. Location, Hanalei, Kauai; area, 950 acres, term, fifteen years; annual rental, \$30.

Feb. 21. Hawaiian Agricultural Co., purchaser. Location, Kaalaala, Kau, Hawaii; area, 160 acres; term, ten years; annual rental, \$401.

Cash Sales.

Feb. 7. Oahu Sugar Co., Ltd., purchaser. Location, Pauhala, Ewa, Oahu; area, 1.8 acres; price, \$350.

Feb. 7. R. W. Shingle, purchaser. Location, Lot 800, Makiki, Oahu; area, 20,604 square feet; price, \$501.

Feb. 7. R. W. Shingle, purchaser. Location, Lot 801, Makiki, Oahu; area, 27,012 square feet; price, \$651.

Cash Freehold.

Feb. 23. M. Kalaemakani, freeholder. Location, Olaa, Puna, Hawaii; area, 2.80 acres; price, \$7; No. of agreement, 92.

HAWAIIAN POULTRY ASSOCIATION.

The Hawaiian Poultry Association held its annual meeting on March 14, when the following officers for the ensuing year were elected: Raymond C. Brown, president; Dr. C. B. High, vice president; J. J. Greene, secretary. Besides these three the board of directors consists of J. H. Craig, C. Montague Cooke, Walter E. Wall and Seeley I. Shaw.

Instead of holding a show for poultry alone next year, it was proposed to hold a Territorial fair which will include all kinds of live stock. The Hawaiian legislature will be asked to appropriate money to insure a success.

COOPERATION.

By Dr. E. V. Wilcox, Chairman of Commission on Diversified Industries.

It is impossible for any country to become developed to the fullest extent in an industrial way, or to furnish completely satisfactory conditions for human life and citizenship until a considerable variety of crops have been placed upon a business basis. In no other way can a varied population find satisfactory means of livelihood for all concerned and the conditions for happiness and contentment which are demanded by human beings.

So soon, however, as attention is called to the extent of unoccupied land, and the desirability of cultivating this land, whether it occurs in small or large areas, we are met with numerous objections and formulated difficulties in the way of raising diversified crops, and of marketing them profitably after they are raised. After having listened for some time to the complaints which are made by the producer of diversified crops, it occurred to me to be a wise plan to investigate the

matter, first from the standpoint of the dealer. It was hoped that in this way satisfactory information could be obtained as to what sort of agricultural produce is demanded by the trade, and therefore desired by the dealer; the regularity with which it can be obtained, the uniformity and quality of the produce offered for sale, and particularly the attitude of dealers and commission merchants toward Island produce, as compared with that imported from California and other points of the mainland.

ISLAND PRODUCE PREFERRED.

With this idea in mind, extended interviews were held with the leading grocers and commission merchants of the city. It was found that a very gratifying uniformity of opinion is held by all of these men, without exception. All of them prefer to handle Island produce, rather than imported produce, if the former can be obtained in satisfactory condition and with regularity. No prejudice was found to prevail anywhere against Island produce;—on the contrary, the trade takes kindly to it and asks for it by preference.

We have, therefore, to consider, first, certain details regarding the kinds of produce which are in demand and the difficulties which are now experienced in obtaining this produce in the quantities desired, at the times when it is needed, and in the condition in which the trade wishes to have it.

In subsequent articles the difficulties in the cultivation of these crops and in their transportation and marketing will be presented, and such practical remedies will be suggested as will likely help toward solving our difficulties. Finally, we intend to present a general plan for encouraging, in a substantial way, the cultivation and proper marketing of those crops which can be successfully grown in Hawaii, and which are demanded by the trade in constantly increasing quantities.

REGULAR AND URGENT DEMAND.

It seems almost necessary to state that there is little use in encouraging the production of things for which there is no demand, and therefore no market. It should, however, serve as a great encouragement, to those who are interested in the complete development of the Territory, to know that there is a regular and urgent demand on the part of our consuming population for a large variety of farm products, and that the commission men, wholesale dealers, retail dealers and public will take by preference Island produce. The statements to this effect, which I have obtained from all of our leading dealers, were not based on a patriotic sentiment which might, sooner or later, lose some of its ardor, but on the more lasting foundation of demand by the trade for products which we can raise in the Territory.

CO-OPERATION AND PRINTERS' INK.

The first dealer with whom I had an interview on this subject, handles a number of Island products, including jellies, jams, chutneys, pickles, taro flour, starch, rhubarb, celery, sweet potatoes, dry beans, mangoes, avocados, pineapples, limes, oranges, pomelos, eggs and turkeys. No complaint was made regarding the quality of jellies, jams, chutneys and pickles. The demand for these products is increasing slowly and the quality of the goods is satisfactory. Taro flour is, of course, an incidental product which has thus far not come into wide use, but there is a slightly increasing demand for it. All of these products are put up in a form in which they could be safely held for long periods and could be shipped to the mainland without deterioration. In order to place these products, or other Island products, on the mainland markets, however, it is necessary in the first place that the producers of these products should get together in a friendly coöperative way; adopt modern methods of advertising and marketing. As soon as this is done in a business-like way, there is no question as to the possibility of opening up a good outlet for the surplus which is not demanded by our Island population.

Rhubarb and celery are furnished the year round to the local dealer, about whom we are now speaking. The rhubarb is received in Honolulu in much better condition than that which comes from the mainland, and is in every way satisfactory in quality. The celery produced in the Islands, as a rule, wilts a little too soon, but is tender and of good flavor. In winter it is usually possible to obtain celery from the mainland somewhat more cheaply than the growers here care to sell it.

SWEET POTATO DEMAND.

The sweet potatoes, which are furnished to the local market, are sadly lacking in uniformity of shape, color and flavor. Sweet potatoes are not imported from the mainland, and the local market is, therefore, exclusively in the hands of local producers. I have been repeatedly assured that ten times as many sweet potatoes as at present could be handled in Honolulu if they were supplied regularly and in uniform condition. Some of the producers have been informed of this fact, and yet have not given sufficient attention to the matter. It is impossible to force a product upon the public in a condition in which they do not want it.

Tons of dried beans of various varieties are imported annually and all of these could be profitably raised in Hawaii. The mangoes and avocados which are offered on the market are also sadly lacking in uniformity, some of them being delicious in flavor, and others scarcely fit to eat. The same may be said of papayas—in fact, all of these fruits would be demanded in

much larger quantities than are now brought to market if attention were given to the one point of producing a good quality of fruit, and maintaining that quality in all shipments to Honolulu.

NOT ENOUGH LIMES.

The dealer in question assured me that he could handle all the limes that could be furnished. At no time of the year is the supply of this fruit equal to the demand. Practically all lemons consumed in the Territory are imported from the mainland; they, too, could be grown here.

Some of our seedling oranges are of excellent quality, but the supply on the market is too variable, in both quantity and quality, to maintain an active demand.

Our pomelo is as good, or better, than that imported from the mainland; but no dealer can secure a sufficient quantity of Island pomelos for his own trade.

EGGS IN DEMAND.

Eggs are in constant demand at a high price, and there is a decided preference for Island eggs. Nevertheless, thousands of dozens have to be imported annually from the mainland to supply the trade. The same may be said of turkeys, and this in spite of the almost astonishing fact that turkeys take care of themselves here practically without attention; and, in fact, run wild on several of the Islands. So long as a turkey brings as much as a sheep on the market, it seems difficult to understand why more attention is not given these birds as a sideline on ranches, or in other localities where they have free range.

Article II.

The second dealer, who was recently interviewed, handles honey, eggs, coffee, jam, jelly, chutney, pia, taro flour, sweet potatoes, limes, pomelos and a number of other Hawaiian products, almost all of which are obtained from the Island of Oahu. This dealer has experienced difficulty in obtaining such products as he handles from the other Islands. The difficulties, as he thinks, are largely concerned with transportation. Floral honey, unmixed with Honey-dew honey, finds a ready sale in considerable quantity, both in bulk and in bottles. If one considers the fact that this honey can be obtained at about one-tenth the price of imported honey, it seems as if a larger quantity of it should be used locally. The dealer in question handles only Island eggs. He is unable to obtain as many as he wishes for his trade, but whenever he has no Island eggs, he can not satisfy the demand of his trade for

eggs for the reason that he refuses to handle imported eggs. The latter brand of eggs is sometimes fairly satisfactory, and sometimes quite unsatisfactory, and the dealer thinks it best to lose the profit, which could be made from handling case eggs, rather than take the chance of disappointing his trade with eggs of poor quality. The same experience was related in regard to sweet potatoes, limes and various other products, as was noted before, namely, that the sweet potatoes lack uniformity and are not regularly supplied; and that limes are not available in sufficient quantities. It was definitely asserted that if more of these commodities could be obtained at regular intervals the local trade could be greatly increased.

A commission man, who was next interviewed, handles considerable of the corn which is sent from Maui. He stated that the local market for corn could be increased and that the demand is already in excess of the supply. He has found the supply irregular, but the corn which he obtains is fairly satisfactory to the trade and competes successfully with imported corn. The dealer asserts that the growers of Maui can meet Seattle prices on corn and make a reasonable profit.

Dry beans can not at any time be obtained in sufficient quantities for the local trade, and if supplied regularly to Honolulu would be shipped by the dealer in question to the Coast. This would furnish an outlet for an indefinite quantity of dry beans of several varieties.

A fourth dealer is also interested in the corn crop. His trade requires corn of a small, yellow kernel; much of the corn which is supplied him has too large kernels. It is also desirable that the corn should be kiln dried. About 4,000 bags of corn are imported annually,—part of it from Manchuria. Cracked corn, prepared on Hawaii, satisfies the demands of the trade as to quality, and could be used locally in larger quantities than are now supplied. During the period from December to June far more onions than are now grown here could be used locally and would be welcomed at $3\frac{3}{4}$ cents per pound. Garlic, which can be readily grown in Hawaii, is imported at the rate of two tons monthly and sells for $5\frac{1}{4}$ cents per pound. Beans, both Lima, calico, white and other varieties, are imported by this one firm to the extent of \$60,000 annually. All of these could be grown in Hawaii and would be preferred to the imported article.

The corn growers of Maui say that the price received for corn is too low and that there is little or no profit in growing corn at the present prices. The method of marketing the corn, however, is responsible to a large extent for the unsatisfactory returns to the grower. It is a common thing for four or five dealers to receive shipments of corn on the same day, and the dealers are expected to pay whatever price they can from the standpoint of their own profits in the business. The growers appear to assume that if their corn shipments

are divided among a number of dealers a competition in price will thus be accomplished, so that they will, therefore, receive a higher price than otherwise for their corn. As a matter of fact, this manner of marketing brings about exactly opposite effects. Each dealer, in determining the price which he can pay for corn, must first stop to consider whether some other dealer is not paying less and will therefore be in a position to undersell him to the trade. Competition is, therefore, downward, rather than upward, since the dealers naturally can not take a chance of paying more than some other dealer has paid. It is only too evident that many growers fail to recognize the fact that the dealer sells on a margin, and is, therefore, not so much concerned with the actual price which he must pay for his produce, provided all dealers have to pay the same price. So long, however, as one dealer is not in a position to know what another dealer has paid for a given product on a given day, he will naturally offer a price low enough in his opinion to meet the price of other dealers. This unsatisfactory condition could only be met by shipping all of the corn to one place and obtain, by auction or some other method of sale, a uniform price. Under those conditions dealers would gladly pay more than they now do, for the reason that a margin on a higher price yields somewhat larger profits than the same margin on a lower price.

Article III.

An interview with a commission man who ships considerable of our rice to the mainland disclosed the fact that the rice growers are losing a part of their profit on account of carelessness in milling and grading their rice, and on account of the lack of organization, and, therefore, a lack of mutual understanding as to standard qualities of rice required by the market. The commission man, in order to make a sale of rice to the mainland, must furnish small samples upon which he receives quotations from prospective buyers. A shipment of rice made on such quotations must, obviously, correspond in quality to the samples, otherwise the agreed price will not be paid, and embarrassment is experienced by all parties concerned.

Complaints have frequently been made that too much cracked grain and imperfect kernels are allowed to remain in the milled rice. This lowers the value of the whole product and a corresponding loss is experienced by the producer. It is, unfortunately, sometimes assumed by the producer that a small quantity of cracked grains left in the milled rice will not be noticed by the buyer, and that the producer will thus be so far ahead in the business deal.

In plain English, this is an attempt at deception and is invariably detected. It is impossible to deceive expert buyers as to the quality of goods furnished, and since no firm will remit the agreed price upon a product which does not come up to the sample in quality, it is obviously necessary to be strictly honest in this regard.

It is a lamentable fact that so many farmers have disregarded this point and have believed that it was possible to allow the quality of their product to deteriorate without fear of detection on the part of the buyer. This practice works only to the harm of the farmer. A product must meet the standard of the sample submitted and must be uniform in quality, otherwise a loss is experienced. The cracked grains and screenings, if removed as completely as possible, would still be salable, although at a lower price. The remainder of the milled rice, in first-class condition, would then bring the prevailing market price for a high grade product.

The commission man in question assured me that a loss of fifty cents per hundred pounds is experienced by the rice growers in shipping the rice to the mainland, on account of a lack of organization and carelessness in grading the rice. In some instances, this sum of fifty cents would mean all the difference between a profit and a loss to the grower. The matter has been submitted to the rice growers and some of them understand the importance of it and have attempted to meet the demands of the trade. Unfortunately, however, others have neglected to do so, and this brings about a lack of uniformity in the total milled rice product. Continually objections are, therefore, made by the trade on the mainland and the price offered is sufficiently low to make good the loss which the dealer would experience in handling an ununiform product.

I have been assured that if the rice growers of the Islands would form an organization and make a determined effort to furnish certain uniform qualities of rice, that the commission men would be willing to advance at once 75 per cent. of the value of the rice. So long as the quality of the rice, however, is ununiform it is unsafe for a commission man to make such an advance.

This condition in the rice industry is mentioned chiefly for the purpose of calling attention to the fact that the troubles in developing a diversified farming industry in Hawaii are not due solely to unsympathetic commission men and transportation companies, but are partly due to the carelessness and lack of business methods among the producers themselves.

Article IV.

The crops and products which have been mentioned in previous articles as being in demand by the local trade constitute only a part of those which are consumed in the Territory, and which can be grown profitably. We might also mention potatoes, peppers, and a large variety of garden truck, and also forage plants, especially for horses and chickens. The high cost of imported feeds is the chief obstacle in the way of profitable poultry raising in the Islands, and this obstacle can be overcome only by producing local feeds in quantities sufficient to meet the demand. Those individuals who have entered upon the business of producing forage for horses have met with encouraging financial success. The number of horses and mules in the Territory is constantly increasing, especially in connection with the military posts established on the Island of Oahu. Wheat hay and barley have been grown here and can be produced profitably. Alfalfa hay could well be produced in a much larger quantity than at present, and a profitable sale would be found for it if more earnest attention were given to the matter.

Without going into more details concerning the individual crops which should constitute the bulk of our Island produce, we may say that we have already shown that these products are now demanded by the consumer; that with very few exceptions, at least, the local dealers and commission men are glad to handle local products; and that the only reason why such large quantities of these products are imported is that they can not be obtained from local sources. The next question which constitutes a part of our inquiry is whether these things can be grown successfully in Hawaii. In reply to such a question, we receive various answers. In the first place, one hears of the numerous failures which have occurred. The seed was unsatisfactory, and either rotted in the soil or produced miserable plants and an unsalable crop. If no trouble was experienced with the seeds, then the horde of insects appeared at an unfortunate moment and destroyed the crop,—and so on through the long list of troubles which the small farmer has met with in Hawaii. In reply to these complaints, it should be stated at once that the long list of griefs and troubles which have fallen to the lot of the small producer in Hawaii are exactly the same as those which have been met and overcome in every locality where farming is successful. The methods to be adopted for overcoming these troubles are slightly different, with us, from those of other localities, but are not more difficult of application. If one has doubts about the production of garden truck in Hawaii he has merely to visit a Chinese truck garden, in which he will find all sorts of garden vegetables in flourishing condition. Are all other races to admit that the Chinese alone have secrets by means of

which they can produce vegetables, while others must fail? The chief, and only, secret of the success of the Chinese gardeners lies in the fact that they are always at work giving attention to their crops whenever it is needed. The methods of large ranches and plantations, which have gone through cultural and business difficulties, and finally emerged on the smooth road of ease and success, are not those of the cultivator of a few acres. No man, to whatever race he may belong, can hope to make a living, and lay up something for the future, from ten acres of land if he adopts the habit of living in a city, riding about in automobiles and leaving the entire management and actual work of his homestead in the hands of hired labor. Success from a small acreage depends strictly on giving one's own attention and own labor to the development of the place. Those who are not willing to do this can assuredly hope for little profit from the returns of a few acres worked by more or less disinterested parties.

Article V.

A by no means rare complaint which is heard in various parts of the Islands is that the most influential persons of the Territory are not in favor of the development of minor agricultural industries, or are even antagonistic to such development. This complaint is really not well founded and can not be considered as true under the circumstances, except with certain specific qualifications. Numerous attempts have been made to provide the lands and means necessary for the laborer to grow his own vegetables in the neighborhood of his quarters. The fact that such attempts have not been as successful as was to be desired is due as much to a lack of interest on the part of the laborer as to inadequate provision made by the employer. When the complaint is stated without qualification it is nothing less than sheer nonsense, for no business man, nor sugar planter, nor other individual whose means are invested in the Territory can possibly have a desire to hinder the ultimate welfare of Hawaii. More and more conclusive evidence is accumulating to prove the substantial interest which many of our wealthiest citizens are taking in the establishment of a variety of profitable agricultural industries.

The numerous complaints which are made regarding the lack of sympathy on the part of our various transportation companies are likewise not true, except when properly qualified. Transportation companies are in the business of carrying freight, and the more freight they have to carry the more profit they can obtain. It is well known that special facilities for carrying freight have been furnished in the case of the

pineapple business, and other industries will receive consideration as soon as they are taken up seriously and therefore furnish enough freight to interest the transportation companies. It would be contrary to human nature to expect a transportation company to give the same attention to one crate of vegetables, or some other agricultural product, as they would to a large amount of freight coming at regular intervals from some established industry. Even the mishaps which have been reported as occurring in transit to small shipments of agricultural products, have often been due to obvious carelessness in packing this produce and in delivering it at a time when delays in shipment would be avoided. In the matter of transportation, it will, of course, be necessary to secure some friendly understanding and coöperation between the producers and the transportation companies. The latter can not be expected to arrange special facilities for carrying freight which is not in definite prospect. On the other hand, the producer is often a man of small means and must secure immediate returns from his produce. He, in turn, can not wait too long for means to carry his produce safely and cheaply to market. It is a practical certainty, however, that as soon as a determined effort is made to produce larger quantities of general agricultural produce suitable means will be provided for carrying this freight to market.

Article VI.

With the development of modern business methods the small producer began to feel his weakness and inability to meet the demands of his environment. The cultivator of a small area has only small quantities of produce, of whatever kind he raises, and can, therefore, not occupy an important place in the market. He receives no special consideration from buyers or transportation companies and can not deal with them in a satisfactory manner. The only solution of this difficulty has been found in coöperation. The work and the methods which it involves should be familiar to every farmer, but, unfortunately, this is not true, particularly for Hawaii. On the mainland, coöperative enterprises among farmers at present number among their members more than 3,000,000 individuals and involve more than half the total number of farms in the United States. The number of coöperative societies on the mainland is nearly 100,000, and these societies are concerned in selling fruit, vegetables, nuts, small berries, cotton, tobacco, wheat, sweet potatoes, flax, oats, eggs, poultry, milk, honey, wool, live stock, etc. There is scarcely any branch of farming which has not been organized on a coöperative plan in some locality. Coöperation extends, not only to the

sale of all sorts of agricultural products, but also to the purchase of necessities for farm use. Numerous coöperative stores have been established under the ownership of farmers for purchasing and distributing fertilizer, farm machinery, furniture, seeds and other necessities of the farm. A coöperative woolen mill is in operation in New Mexico, where 2,000,000 pounds of wool are annually manufactured into clothing and the clothes are sold to members of the coöperative society at somewhat less than one-half the commercial price for clothes of similar quality. Coöperative banks, insurance companies and telephone companies have been established by farmers and have given excellent satisfaction, together with great economy. There are hundreds of coöperative telephone companies throughout the mainland which furnished unlimited service within a radius of fifty miles for from \$3.00 to \$10.00 per year to each member.

Enough experience has been had with coöperation among farmers to demonstrate conclusively that any farm enterprise and any necessity of the farm may be successfully managed in a coöperative way. In succeeding articles I propose to give a few examples of how coöperation has been put in operation among farmers. Perhaps the first objection that will be made to any plan of coöperation in Hawaii is the difficulty of organizing a workable plan. This difficulty rests primarily on the diversity of race among our small farming population. The difficulty is sufficiently obvious to every one, but the reply must be overcome before any great progress can be made in the marketing of farm produce.

Article VII.

As an example of what may be accomplished among a farming community of ordinary intelligence and business ability it may be well to mention the little rural town of Ruthven, Iowa. In the countryside about this town there are five coöperative societies which have passed the experimental stage and are thoroughly established financially and in the minds of the people. A local telephone plant was bought by the farmers and established upon a coöperative basis. Within two years 270 instruments were put in operation and the cost for unlimited service is now \$7 a year, as compared with \$18 a year before the coöperative plan was adopted. No farmer who has produce to sell can afford to be without the means furnished by a telephone for putting him in communication with the market, so long as telephone service can be obtained at such a remarkably cheap rate.

A coöperative creamery company was organized among the farmers the following year, and in addition to paying a higher

price for cream than had previously been charged, the creamery yields a dividend of 8 per cent. on the stock. Incidentally, the social intercourse, which was made possible and necessary by the coöperative plan, contributed greatly toward the raising of the standards of dairy sanitation among all the members. After running the creamery one year, insured according to the ordinary plan, a coöperative insurance scheme was put in operation. By means of a "sinking fund," allowed to accumulate and loaned on first mortgages on farms, the insurance policy now pays \$100 per year, instead of costing \$55 a year, as was previously the case.

A coöperative buying enterprise was also organized among the farmers with a capital stock of \$2500. The society buys and sells for its members various kinds of farm produce, oil, coal, binding twine, fertilizer, etc. A coöperative grain elevator was erected in accordance with this scheme, and after passing through stormy days, won out financially.

The farmers' wives were not satisfied with assisting in the coöperative schemes, which their husbands had put on foot, but started among themselves what was perhaps the first organization of its kind on the mainland. The women proposed to handle eggs and poultry in a coöperative way. During the first year twenty-five farmers' wives were associated in this work and sold 8500 dozen eggs at a price of five cents in advance of that which had previously been received. They soon branched out into poultry and such other farm produce as is frequently left to the attention of farmers' wives. In addition to these schemes, a stockman's auxiliary was organized for the purpose of buying and selling beef cattle. This organization has also met with pronounced success.

During one year of operation the five coöperative schemes, set on foot by the farmers in the neighborhood of one little town, put an extra \$42,350 into the pockets of the farmers. It evidently pays the farmer to run his own business. What has been done in Ruthven can be done in any rural community. Coöperative enterprises are eminently successful, and the factors of success have everywhere been: common sense, business methods, industry, a fraternal spirit and faithfulness.

Article VIII.

Important and extensive as is the citrus fruit industry of California, it had for some years ceased to be really profitable previous to the organization of the Southern California Fruit Exchange with headquarters at Los Angeles. This coöperative Exchange has now been in operation about eighteen years and has proved even more effective and useful than its organizers anticipated. In the management of the Exchange

no one but citrus growers has any influence or authority in its policy. The regions in which citrus fruits are grown in California are organized into local associations which are grouped about a local Exchange, each association having, as a rule, one representative in the local Exchange. Each local Exchange, in turn, selects one representative for the central Exchange. At present there are fifteen local exchanges and nearly seventy associations, all organized coöperatively and transacting their business with the fruit consuming public through the central Exchange in Los Angeles. This system secures a perfect understanding of the demand for citrus fruits in various parts of the country and of the supply on hand in all of the different markets. The quantities and kinds of citrus fruits which are needed for various cities and towns are known by telegraph at the central Exchange and the distribution of all fruit is made in accordance with this information. By this means it is easy to avoid overstocking or shortage of the citrus fruit market in any given town. The orders to supply the demands for the various markets are issued in such a way as to relieve most effectively the accumulation of fruit which has taken place in any one association. The fruit is thus marketed with the least possible loss at the place of production, and distributed in the most uniform manner which can be devised. All men concerned in the packing and distribution of the fruit are growers or on the payroll of the Exchange. Direct representatives of the citrus growers have been found to be much more satisfactory in protecting the interests of the industry than men who work on commission and who have other interests. The local associations are kept informed as to the losses which occur from improper methods of packing, and any complaints which may be received at the central Exchange regarding the quality or packing of any crate of citrus fruits can be at once referred to the individual concerned. In this way great improvement has been brought about in the grading of citrus fruits and in the care with which they have been packed. The Southern California Fruit Exchange has, therefore, found it possible, by means of careful business methods and a masterful control of the situation, to ship citrus fruit 3000 miles across the continent and market it successfully in competition with the Florida growers, who are much nearer the eastern markets.

Previous to the organization of this Exchange, the growers were entirely at the mercy of transportation companies and were often unable to secure rates and cars for shipping their fruits so that even a bare profit could be made. Now the strength of the organization has been made apparent, their business methods are dignified and satisfactory and their influence is such that their requests are considered by all business men with whom they have dealings.

The extent of the citrus industry in California is, of course, an important matter from a business standpoint, and the influence even of certain individuals was considerable in advance of any coöperative organization. They found themselves, however, unable to cope with the difficulties of distribution and marketing without an organization, and these difficulties have been solved by the coöperative arrangement. There is, obviously, a greater necessity of organizing among the relatively uninfluential small producers in this Territory.

Article IX.

Cotton raising was late in the list of industries which have yielded to the necessity of coöperative organization. During the long period of development of cotton production in the South, the individual grower felt the need of the money from his crop as soon as it could be marketed. He was, therefore, strictly at the mercy of the speculative cotton buyer, who could manipulate prices to suit his own interests, as soon as the supply of cotton was out of the hands of the producer. Within recent years some attention has been given to the organization of coöperative associations, dealing with one phase or another of the cotton industry. The simplest organization which could be effected concerned the process of ginning. A number of coöperative gin mills have been erected in Oklahoma and Texas and have given complete satisfaction. It has been found possible to control the seed supply better where the whole industry is in the hands of the farmer, and the total profits obtained from the yield of cotton are a little larger than under the old system. Recently small coöperative cotton warehouses have been established, and this enables the grower to hold his cotton for a more favorable market, rather than selling it all at the beginning of the season, when the price is almost always at the lowest point.

Cotton lends itself peculiarly to a great variety of farming conditions. It can be grown in areas of any size, from one-half acre to thousands of acres. If only small patches are grown, there is no necessity of purchasing any special machinery whatever. The seed cotton can be either all sold to brokers or taken to a coöperative or commercial gin mill. Even if larger areas are grown the necessary machinery is still very inexpensive. A gin of a capacity of 1000 pounds of lint per day can be purchased for about \$125. The fact that cotton is preëminently a money crop makes it a simple matter to obtain an advance upon the year's crop as soon as it is delivered to the warehouse and before any sale has been effected. This relieves the financial stress to such an extent that coöperative warehouses can be built and maintained by a comparatively

small number of cotton growers of moderate means. The presence of a given quantity of cotton in a warehouse is a sufficient guarantee to prospective buyers to advance two-thirds or three-fourths of the value of the crop, and also to banks to loan money on the cotton as security.

Recent experiments with cotton in Hawaii indicate that reasonable profits may be expected from this crop in a variety of situations. The quality of lint is remarkably excellent. Quotations received within the past week on average samples of four varieties of cotton are as follows: For Caravonica and Egyptian, 29c per pound; 31c for sea island, and 15c for upland cotton. The unsatisfactory quotations received from samples which have been sent by certain growers to cotton brokers have, in the main, been due to the fact that these brokers were interested only in upland cotton and did not have any interest in a careful examination of the long-linted cottons. This is another evidence of the necessity of an organization among cotton growers, whereby they may select the proper markets and make known in a business way the quality of the cotton which they have for sale.

Article X.

In his message to Congress, December 5, 1906, President Roosevelt said: "Organization has become necessary in the business world, and it has accomplished much good in the world of labor; it is no less necessary for farmers." The country life commission, appointed by Mr. Roosevelt, came to the conclusion that the most important matter in the improvement of farming conditions was that of better organization in a coöperative way. The movement is gaining ground every day, but obviously needs to be extended much farther and to include much larger secondary organizations of coöperative associations. The farmer has been merely a producer, content to let the other man distribute his products to the consumer. In so doing he has become a skilled agricultural scientist and the federal and state departments of agriculture have greatly assisted him in this regard. In the mean time, however, others have reaped the benefits of his skill and industry. Many of the largest fortunes in the world have been made in the speculative and legitimate distribution of the farmer's products. At last he is beginning to understand that by coöperation he can control the distribution of his own products and prevent speculation in them. This will be of benefit, not only to the producer, but to the consumer.

It may well be asked why the farmer should have ever failed to get a remunerative price for his products? All farm products are necessities, and must be distributed to the consumer.

Farmers, however, have hauled their products to town, or shipped them by rail or boat, in packages indifferently prepared. Their produce arrives on the market in an unattractive condition, the result being that the buyer prefers to go to the regular dealers and pay his added profit. The only remedy for this state of things is to be sought by the farmer in studying the art of marketing produce, and the business end, as well as the producing end, of agriculture. It is necessary to combine in coöperative associations, if necessary, raising money by subscription to build markets, and to hire experienced men to manage these markets. The immediate results of such coöperation have everywhere been increased profits to the producer and a lower price for produce to the consumer. It is easy to understand how this occurs when we consider that the present system of distribution is well calculated to prevent the consumer from dealing in any direct manner with the producer. The number of links in the chain of distribution has been increased beyond all reason, with the result that we pay too much for farm produce and the farmer gets too little. The farmer and his patron must, therefore, get together. The merchant's business is based on the principle of buying at wholesale prices and selling at retail. The farmer, on the other hand, buys at retail and sells at wholesale prices. He buys farm machinery, fertilizers, groceries, clothing and other necessities of retail dealers. He sells his produce to commission men and wholesalers and, of course, at wholesale prices. The merchant often complains that it is difficult to make a living at his business, even with the shrewdest management. How then does the farmer succeed in making both ends meet with his utter lack of business methods?

In Hawaii we should have coöperative associations of the producers of pineapples, rice, coffee, cotton, bananas, rubber, tobacco, beef, mutton, and poultry. The producers of each of these desirable commodities have mutual interests to be best served by coöperation, and secondary affiliation between these groups of producers could be made later to mutual advantage.

COAST PLANT INSPECTION.

The following is from the Sacramento Union, and will be of interest to local shippers of fruit:

According to the report of the horticultural commissioner of the quarantine work done in San Francisco last year, there were 254 steamers which brought fruits and vegetables, plants and bulbs into that port during the twelve months.

These shipments, all of which were carefully inspected, were classified as follows:

Crates of fruit and vegetables, 71,126; packages of plants and bulbs, 1,719; hand packages of fruits and plants brought by passengers and members of the crew, 1,868. The railroads brought into San Francisco by freight and otherwise 528 packages.

Of the total number of packages arriving in San Francisco, 427 were destroyed or refused landing because they were infected with some dangerous insect pest or plant disease. A large number of the packages not destroyed or refused landing were thoroughly fumigated under the direction of the inspectors.

Shipments of fresh pineapples come in from the Hawaiian Islands on almost every steamer. These are for the most part fumigated before they leave the Islands, but all shipments which may harbor living insects are refumigated before they are released. During the year 2988 crates were thus refumigated, 378 were fumigated twice, and 294 of these were fumigated a third time.

Wholesale fruit merchants and nurserymen in foreign countries who have regular patrons in California have become well acquainted with the California horticultural laws and the nature of the inspection required at the San Francisco port, and the most of them have tried to meet this inspection fairly.

Fruit merchants or nurserymen of lesser standing, or passengers from aboard ships with plants in hand, who do not understand the requirements of the law, often afford much trouble and annoyance. It is through such people with their small lots of fruit or plants, State Commissioner Jeffrey says, that there lies the greatest danger of introducing new pests. Many cases have come to notice where the smallest plant will bear a whole colony of some undesirable insect pest, and it is evident that a constant close watch must be kept on these.

Office: Brewer Building, Queen St.
Works Iwilei,

Telephone 430.
Telephone 272.

The Hawaiian Fertilizer Co., Ltd.

HONOLULU, HAWAII.

MANUFACTURE AND DEAL IN ALL KINDS OF
Fertilizer and Fertilizer Ingredients
INCLUDING :

Bone Meal,	Sulfate Ammonia,
Nitrate Soda,	Sulfate Potash,
Double-Superphosphate,	Dissolved Guano,
Ground Limestone, etc., etc.	

BOARD OF DIRECTORS :

Chas. M. Cooke, President,	E. F. Bishop, Treasurer,
E. D. Tenney, Vice-President,	J. Waterhouse, Secretary,
Geo. H. Robertson, Auditor,	
W. M. Alexander	
C. H. Atherton,	
E. F. Bishop, Managing Director,	
Norman Watins, General Superintendent	

The products of this company are equal in every respect to any fertilizers sold in any market. In none of the conditions are they ranked by those manufactured elsewhere.

We will be pleased to furnish analysis of the soil of any locality in the Territory and make special fertilizers for different soil products arranging the composition to suit conditions.

Prices and Terms on Application.



Anyone sending a sketch and description may quickly ascertain our opinion free whether an invention is probably patentable. Communications strictly confidential. HANDBOOK on Patents sent free. Oldest agency for securing patents. Patents taken through Munn & Co. receive special notice, without charge, in the

Scientific American.

A handsomely illustrated weekly. Largest circulation of any scientific journal. Terms, \$3 a year; four months, \$1. Sold by all newsdealers.

MUNN & Co. 361 Broadway New York
Branch Office, 625 F St., Washington, D. C.

Garden and Farm Tools and Implements

To do good farming you must have up to date tools to work with. We carry a most complete line of everything needed by the small or large farmer, from the smallest hand trowel to the largest cane plow. We also have a good assortment of Hand, Bucket or Barrel Sprayers. Our assortment of Hoes, Shovels, Spades, Mattocks, Rakes, Garden Shears, Lawn Mowers, Garden Hose, and other things that are needed daily about the farm or garden, is most complete and our stock large.

E. O. HALL & SON, LTD.

Board of Agriculture and Forestry.

PUBLICATIONS FOR DISTRIBUTION.

Any one or all of the publications listed below (except those marked *) will be sent to residents of this Territory, free, upon application to Mailing Clerk, P. O. Box 331, Honolulu.

BOARD.

- Report of the Commissioner of Agriculture and Forestry for 1900; 66 pp.
Report of the Commissioner of Agriculture and Forestry for 1902; 88 pp.
* First Report of the Board of Commissioners of Agriculture and Forestry, from July 1, 1903, to December 31, 1904; 170 pp.
Second Report of the Board of Commissioners of Agriculture and Forestry, for the year ending December 31, 1905; 240 pp.; 8 plates; 10 text figures.
Third Report of the Board of Commissioners of Agriculture and Forestry, for the year ending December 31, 1906; 212 pp.; 3 plates; 4 maps; 7 text figures.
Fourth Report of the Board of Commissioners of Agriculture and Forestry, for the calendar year ending December 31, 1907; 202 pp.; 7 plates.
Fifth Report of the Board of Commissioners of Agriculture and Forestry, for the calendar year ending December 31, 1908; 218 pp.; 34 plates.
"Notice to Importers," by H. E. Cooper; 4 p.; 1903.
"Digest of the Statutes Relating to Importation, Soils, Plants, Fruits, Vegetables, etc., into the Territory of Hawaii." General Circular No. 1; 6 pp.
"Important Notice to Ship Owners, Fruit Importers and Others. Rules and Regulations Prohibiting the Introduction of Certain Pests and Animals into the Territory of Hawaii." General Circular No. 2; 3 pp.; 1904.
"Law and Regulations, Importation and Inspection of Honey Bees and Honey." General Circular No. 3; 7 pp.; 1908.
"The Hawaiian Forester and Agriculturist," a monthly magazine. Vols. I to VI; 1904-1909. To be obtained from the Hawaiian Gazette Co., Honolulu. Price \$1 a year.

DIVISION ON ENTOMOLOGY.

- "The Leaf-Hopper of the Sugar-Cane," by R. C. L. Perkins. Bulletin No. 1; 38 pp.; 1903.
** "A Catalogue of the Hemipterous Family Aleyrodidae," by G. W. Kirkaldy, and "Aleyrodidae of Hawaii and Fiji with Descriptions of New Species," by Jacob Kotinsky. Bulletin No. 2; 102 pp.; 1 plate; 1907.
* "On Some Diseases of Cane Specially Considered in Relation to the Leaf-Hopper Pest and to the Stripping of Cane," by R. C. L. Perkins. Press Bulletin No. 1; 4 pp.; 1904.
"A Circular of Information," by Jacob Kotinsky. Circular No. 1; 8 pp.; 1905.
"The Japanese Beetle Fungus," by Jacob Kotinsky and B. M. Newell. Circular No. 2; 4 pp., cut; 1905.
Report of the Division of Entomology, for the year ending December 31, 1905. Reprint from Second Report of the Board; 68 pp.; 3 plates; 10 text figures.
Report of the Division of Entomology, for the year ending December 31, 1906. Reprint from Third Report of the Board; 25 pp.; 7 text figures.
Report of the Division of Entomology, for the year ending December 31, 1907. Reprint from Fourth Report of the Board; 18 pp.; 1 plate.
Report of the Division of Entomology, for the year ending December 31, 1908. Reprint from Fifth Report of the Board; 26 pp.; 2 plates.

DIVISION OF FORESTRY.

- * "Forest and Ornamental Tree Seed for Sale at Government Nursery." Press Bulletin No. 1; 3 pp.; 1905.
* "Suggestions in regard to the Arbor Day Tree Planting Contest." Press Bulletin No. 2; 7 pp.; 1905.
"An Offer of Practical Assistance to Tree Planters." Circular No. 1; 6 pp.; 1905.
"Revised List of Forest and Ornamental Tree Seed for Sale at the Government Nursery." Press Bulletin No. 3; 4 pp.; 1906.
* Instructions for Propagating and Planting Forest Trees." Press Bulletin No. 4; 4 pp.; 1906.
"Instructions for Planting Forest, Shade and Ornamental Trees." Press Bulletin No. 5; 7 pp.; 1909.
"Na Hoakaka no ke Kanu Ana i na Laau Malumalu ame na Laau Hoohiwahiwa." Press Bulletin No. 6; 8 pp.; 1909.
Report of the Division of Forestry, for the year ending December 31, 1905. Reprint from Second Report of the Board; 77 pp.; 5 plates.
* Report of the Division of Forestry, for the year ending December 31, 1906. Reprint from Third Report of the Board; 123 pp.; 4 maps.
Report of the Division of Forestry, for the year ending December 31, 1907. Reprint from Fourth Report of the Board; 70 pp.
Report of the Division of Forestry, for the year ending December 31, 1908. Reprint from Fifth Report of the Board; 85 pp.

** This Bulletin will be sent only to persons interested in the subject.

* Out of Print.

Board of Agriculture and Forestry.

PUBLICATIONS FOR DISTRIBUTION—Continued.

DIVISION OF ANIMAL INDUSTRY.

- * "Inspection of Imported Live Stock." Rule 1; 1 p.; 1905.
- * "Inspection and Testing of Imported Live Stock for Glanders and Tuberculosis." Rule 2; 1 p.; 1905.
- * "Concerning Glandered Horse Stock in the Territory." Rule 3; 1 p.; 1905.
- * "To Amend Rule 1, Inspection of Imported Live Stock." Rule 4; 1 p.; 1907.
- * "Rules and Regulations, Inspection and Testing of Live Stock." Rules and Laws; 11 pp.; Revised; 1910.
- * "Quarantine of Horse Stock from California." Rule 8; 1 p.; 1908.
- Report of the Division of Animal Industry, for the year ending December 31, 1905. Reprint from Second Report of the Board; 62 pp.
- Report of the Division of Animal Industry, for the year ending December 31, 1906. Reprint from Third Report of the Board; 41 pp.; 3 plates.
- Report of the Division of Animal Industry, for the year ending December 31, 1907. Reprint from Fourth Report of the Board; 104 pp.; 6 plates.
- Report of the Division of Animal Industry, for the year ending December 31, 1908. Reprint from Fifth Report of the Board; 44 pp.

DIVISION OF FORESTRY.

FOREST AND ORNAMENTAL TREE SEED AND SEEDLINGS FOR SALE AT THE GOVERNMENT NURSERY.

The Division of Forestry keeps constantly on hand at the Government Nursery, seed and seedlings of the important native and introduced trees. These are sold at prices just covering the cost of collection or growing.

The list includes both forest and ornamental trees, such as Silk Oak, Koa, various species of Eucalyptus, Golden and Pink Showers, Pride of India, Poinciana, Albizzia, etc. The price of the seed varies from 10 to 50 cents per ounce. The seedlings may be had for 2½ cents each, except a few kinds which are 5 cents. Seed of the various palms is also for sale; the price per 100 varying from \$1.00 to \$2.50. All seed is tested before being sent out, which insures its being good.

All communications in regard to seed or trees should be addressed to David Haughs, Forest Nurseryman, Box 331, Honolulu, Hawaii.

RALPH S. HOSMER,
Superintendent of Forestry.

DIVISION OF ENTOMOLOGY.

To give information about insects free of charge is one of the duties of this Division and Hawaiian readers are hereby invited to make inquiry in person and by mail. In order to be able to advise intelligently or send the right kind of useful insects for relief we like and sometimes it is indispensable for us to see the insect suspected or caught in the act, also specimens of the injury. In a tin with a hole or two, or a wooden box specimens may be mailed at 3rd class rates. When specimens are not accompanied by letter *always* write your name and address in the upper left-hand corner of the package. Address all communications SUPERINTENDENT DIVISION OF ENTOMOLOGY, P. O. BOX 331, HONOLULU, HAWAII.

EDW. M. EHRHORN,
Superintendent.

VOL. VII

APRIL, 1910

No. 4

Price, 10c. Per Copy; Per Annum, \$1.00; Foreign, \$1.25.

THE
Hawaiian Forester
AND
Agriculturist

A MONTHLY MAGAZINE

OF

Forestry, Entomology and Agriculture

ISSUED UNDER THE DIRECTION

OF THE

BOARD OF COMMISSIONERS OF AGRICULTURE
AND FORESTRY.

PUBLISHED MONTHLY.

Entered as second-class matter at the Post office, at Honolulu, Hawafi.

ADDRESS ALL COMMUNICATIONS TO

DANIEL LOGAN,

EDITOR "THE FORESTER,"

P. O. BOX 366,

HONOLULU, H. T.

For business relating to advertising or subscriptions, address

HAWAIIAN GAZETTE CO., LTD., Publishers,
VON HOLT BLOCK, 65 S. KING ST., HONOLULU, HAWAII.

CONTENTS:

	Page
Editorial	99
Coöperative Cultivation	102
A New Potato Disease; How to send Crop Diseases by Mail..	103
Scabby Potatoes.	104
Board of Commissioners of Agriculture and Forestry.	106
Division of Forestry	109
Division of Animal Industry	112
Division of Entomology	115
The Closer Utilization of Ohia Lumber	118

OFFICERS AND STAFF OF THE BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY.

COMMISSIONERS.

Marston Campbell, *President and Executive Officer.*
J. M. Dowsett P. R. Isenberg
H. M. von Holt

DIVISION OF FORESTRY.

Ralph S. Hosmer, *Superintendent of Forestry and Chief Fire Warden.*
David Haughs, *Forest Nurseryman.*
Joseph F. Reel, *Botanical Assistant.*
Louis Margolin, *Forest Inspector.*
David Kapihe, *Forest Ranger for Tantalus.*

DIVISION OF ENTOMOLOGY.

Edward M. Ehrhorn, *Superintendent of Entomology and Chief Inspector.*
 Albert Koebele, *Consulting Entomologist.*
 *Assistant Entomologist.*
 D. B. Kuhns, *Inspector's Assistant.*
 Louis Lewis, *Assistant in Inspection.*
 Fred Muir, *Beneficial-Insect Collector.*
 Bro. M. Newell, *Fruit and Plant Inspector, Hilo, Hawaii.*
 Robert R. Elgin, }
 W. O. Aiken, } *Honorary Fruit* } *Mahukona, Hawaii.*
 W. D. McBryde, } *and Plant Inspector* } *Kahului, Maui.*
 Dr. W. B. Deas, } *at* } *Koloa, Kauai.*
 Wm. Robb, } *Lahaina, Maui.*

DIVISION OF ANIMAL INDUSTRY.

Victor A. Nörsgaard, *Superintendent of Animal Industry and Territorial Veterinarian.*
L. N. Case, *Assistant Territorial Veterinarian.*
John Vanhuizen, *Live Stock Inspector.*
J. C. Fitzgerald, *Deputy Territorial Veterinarian for Maui.*
H. B. Elliot, *Deputy Territorial Veterinarian for Hawaii.*
A. R. Glazyer, *Deputy Territorial Veterinarian for Kauai.*

CLERKS AND STENOGRAPHERS.

Miss Melika Peterson, Miss E. M. Kuhn

EDITOR OF THE "FORESTER."

Daniel Logan

LIBRARIAN

Miss Ella K. Dayton

THE HAWAIIAN FORESTER *and* AGRICULTURIST

VOL. VII

APRIL, 1910

No. 4

A circular for free distribution, recently issued by the U. S. Department of Agriculture, treats of fruit growing for home use in the central and southern great plains. As it is the result of a departmental study made for the benefit of a region that is not naturally favorable for fruit on account of the lack of moisture, the circular may be of advantage to homesteaders in the drier parts of these islands. Where irrigation is possible, fruit growing is comparatively easy. If conservation of a scant rainfall is the main dependence, much depends on using the most favorable location, selecting the most suitable varieties, cultivation and manuring of the soil, etc.

Since the publication of the March number, California has adopted more stringent quarantine against Hawaiian vegetables than that therein mentioned. San Francisco merchants forced the issue by appealing over the head of the State Horticultural Commissioner to Governor Gillett, but all they had for their pains was absolute prohibition in place of mere precaution. "Immediately following the appeal," a Sacramento dispatch of April 3 says, "the Governor and Horticultural Commissioner Jeffrey got together and drafted a quarantine proclamation which shuts out Hawaiian tomatoes and cucumbers entirely. Should this fly or maggot get hold in California, Jeffrey says, it would be a great menace to several industries of the State, principally watermelons, muskmelons, cucumbers and tomatoes, which in the islands are raised under mosquito netting to prevent the fly from laying eggs thereon."

An order effective April 1, issued by the Secretary of Agriculture, released from the Federal quarantine for Texas fever or tick fever of cattle certain areas amounting to over 48,000 square miles. The total territory freed of ticks and released from quarantine since the beginning of the work of tick eradication in 1906 is about 130,000 square miles, or an area nearly half the

size of the State of Texas. Under the latest order, the following counties in California are released from quarantine: Fresno, Tulare, Ventura, Los Angeles, San Bernardino, Riverside, and a portion of San Luis Obispo, the remainder of the territory made free being scattered through Texas, Oklahoma, Arkansas, Mississippi, Tennessee, Georgia and Virginia.

Mr. Rock's treatise on Hawaiian plants, mentioned in Forester Hosmer's report in this number, will be interesting and valuable. It will contain an enumeration of the native plants collected by him, with bibliography and notes upon observations made in the field. The native names and uses of the plants will be given, besides the names of insects feeding on them.

Mr. Rock has received a letter from Dr. J. H. Maiden, government botanist at Sydney, Australia, with identifications of some of the Hawaiian eucalyptus. In return he had forwarded to Dr. Maiden a packet containing 86 species of native plants, for which the Division of Forestry will receive specimens of natural grown eucalyptus which will prove valuable for comparison.

Reports of divisional chiefs in this number are exceptionally interesting, containing withal much valuable information. That of the Territorial Forester will give readers at home and abroad some conception of the really great work being done in Hawaii by the territorial forest service. Little Hawaii may indeed be said to approach a parity with Germany in the matter of forest culture, of which country the following is said in a late press notice received from the Department of Agriculture, Washington: "The Germans recognize that the introduction into their forests of valuable trees native to other countries may be decidedly to their advantage. Although as a rule the forest trees best adapted to each region are those which naturally grow in it, there are many exceptions." Our local forestry service is diligently finding such exceptions for the enrichment of Hawaiian forests, as well as sedulously nurturing the many valuable indigenous trees which otherwise were menaced with extinction.

Mr. David Haughs, the forest nurseryman, in his report to Forester Hosmer of the principal work done by him in March, mentions a consignment of seed received from Mr. Gerrit Wilder,

now traveling abroad, which contains a number of varieties of plants new to these islands. These have been planted in the propagating houses. Other rare plants from the same gentleman were on the way. Last month Mr. Haughs sold 1000 plants in transplant boxes and 624 pot-grown, and gave away 190 plants in seed boxes, 2000 in transplant boxes, 200 pot-grown and 4000 for planting on the Pupukea water reserve. All of which makes a total of 8014 plants distributed. This kind of work is going on month after month, creating untold wealth, of both utility and beauty, for the Territory. It is only to be regretted that all of our people who have some land about their dwellings, also the local improvement clubs and the county road authorities of the islands, do not take full advantage of the resources of the Division of Forestry. Seed collecting for the nursery has been continued and enough of the flowering trees and palms to last for several months are in stock. This month the collecting of seeds of forest trees was to begin. Mr. Haughs says that a large quantity of soil has been sterilized by the steaming process lately started, which is a great improvement over the old method of cooking the soil in an open iron box. Bougainvillea vines of the everblooming sort are being planted along the borders of Tantalus road, which will greatly enhance the beauty of that grand scenic highway of Honolulu.

Tropical Life (London) for February features with a red line printed on the cover an article on "The Progress of Cultivating Sugar Cane in Hawaii." A perusal of it shows it to be both comprehensive and up-to-date, characteristics so unusual in foreign write-ups of things Hawaiian as to awaken surprise until the signature is reached. "Crawley" it is and the name ends all wonder, for Mr. J. T. Crawley was not long since one of the most valued agricultural chemists in these islands. He was moreover a ready contributor both to the press and to meetings of technical organizations here.

The report of the Bureau of Agriculture of the Philippine Islands for the year ending June 30, 1909, printed in the Philippine Agricultural Review for January, mentions one million pole plants of maguey as having been ordered from Hawaii to supply the demand of cultivators of the fiber in one certain section. The importation of thirty young avocado pear trees from Hawaii is also mentioned with the remark, "These trees are growing nicely and it is hoped that some will be secured from this lot which will bear fruit."

COÖPERATIVE CULTIVATION.

As some large tracts of land have been, and in future probably more will be, parceled out in homesteads, the question of coöperation in the larger cultivating and harvesting operations must come to be an important one among each community of neighboring homesteaders. If machinery in common is not procured, the end will be attained through the enterprise of individuals who will procure outfits for themselves which they will be able to hire out at reasonable rates. In the latter case the owner would reimburse himself for the original outlay and the upkeep, when the amount of work he had to do for himself alone might hardly be great enough to justify the expense of the machinery. In the big wheat countries either way has been found profitable to the farmers.

In a recent bulletin of the U. S. Department of Agriculture, much general information is given in regard to traction plowing, its economy and practicability being discussed. From a press notice of this bulletin sent out by the Department the following summary is taken, the pamphlet itself containing 35 pages of subject matter:

On the large farms of the great plains and the ranches of California, traction engines—both steam and gasoline—are used to an increasing extent in farming operations, especially in plowing land. The makeshift outfits formerly used for this purpose have been largely replaced by heavier and stronger engines and gang plows especially designed for this use.

The advantages of traction plowing are (1) that the work can be rushed when conditions are favorable; (2) that the work can be done with a smaller force of hands, and fewer horses have to be kept; (3) in hot dry weather engines can be used when horses could not stand the work; (4) with an engine it is possible to plow very difficult soils, and also to plow deeper than with horses; and (5) under favorable conditions, the cost of traction plowing has been brought lower than that of plowing with horses.

The steam engines weigh from 7 to 20 tons, range from 20 to 50 horsepower, cost from \$1,500 to \$6,000, and will plow from 15 to 50 acres a day.

A traction plowing outfit consists of (1) an engine; (2) the plows or disks arranged in gangs; and (3) miscellaneous conveniences for carrying supplies, making repairs, etc. The size and cost of the outfit and the amount of work it will do depend largely on the number of plows operated:

A NEW POTATO DISEASE.

A new enemy of the potato crop is the wart disease, which is attracting great attention in Europe, and which is liable to be introduced into the United States at any time. The U. S. Department of Agriculture has recently issued a circular (for free distribution) giving a brief account of this disease. It affects the tubers, forming large rough unsightly warts, and, in severe attacks, completely destroys the crop. Once the fungus gets into the soil, it is impossible to grow a crop of potatoes on the land for several years.

The fungus which causes this disease was discovered in 1896 in potatoes grown in Hungary. It is now prevalent in many places in England and there is great danger that it may spread to Ireland. It is also found in Germany and some other European countries. It has been carried to Newfoundland, but has not yet appeared in the United States. The disease is spread by using affected potatoes for seed, and, as this country imports considerable quantities of potatoes every year, there is danger that it may be introduced.

HOW TO SEND CROP DISEASES BY MAIL.

The Division of Entomology of the Board of Agriculture and Forestry is desirous of receiving specimens of any and all troubles affecting trees, plants and seeds, in order to be able to examine and investigate these matters and, if possible, give remedies for eradication.

The forwarding of specimens by post is usually an easy matter. It is only necessary to enclose the specimens in a tin or wooden case such that the specimens may be fully protected from the handling to which ordinary postal matter is subjected.

The most important point is that the specimens arrive in the freshest possible condition. To this end they should be gathered and packed shortly before the mail leaves for Honolulu. A few hours extra time in transit sometimes makes a great difference in the state of the shipment on arrival. This matter is therefore an important one, and fortunately, in most cases, a little thought will make it no more difficult to comply with this condition than to neglect it.

If it can be done it is best to send the material in its natural state, that is, not preserved in any fluid.

It is not necessary to send a large amount of material, but every stage possible should be included.

Blighted leaves and twigs may be placed loosely in a tin. The tin should be a close one unless the material will be several days

in transit, in which case it may be advisable to puncture the tin with a few small holes.

As a rule, roots should be sent with the soil attached.

Never send fresh specimens in an ordinary envelope. Some specimens, such as dried leaves and bark, may be sent in this way if wrapped in several folds of soft cloth.

In case any special method is necessary the empty package and the necessary preservatives will be forwarded free, by post, after the receipt of specimens in the ordinary way proves ineffective.

Bottles containing fluid should be enclosed in boxes in packing material so as to exclude all possibility of breakage.

Specimens of leaves or twigs sent in their natural condition should not be gathered when wet, or, if gathered wet, should be allowed to dry until they resume their dry-weather appearance. If enclosed in a package wet they are likely to become mouldy before arrival and this is very undesirable. Roots should be moistened a little—just enough to preserve them in their normal condition until they arrive in Honolulu.

It is very desirable that notes should accompany the specimens. Give the condition of the plant or crop, the variety, its age, length of infestation, soil, nature of the present season, kind of culture, estimated monetary loss, etc.

Address all matters to

E. M. EHRHORN,
Superintendent of Entomology,
Board of Agriculture and Forestry.

SCABBY POTATOES.

Much has been said about scabby potatoes and yet there are very few people who really know what they are. The scab is a fungus disease, similar to the blight on rose leaves or the rust on the stem and pods of beans. The spore-threads of the fungus cause the skin of the tuber to become rough and pitted. The fungus spreads very rapidly and potatoes although apparently clean when first stored, if only slightly scabby, will become badly diseased after a very short time.

Scabby potatoes are very prevalent in many States and for a number of years all shipments of potatoes coming to the Islands have been carefully watched and all shipments showing such infestation were refused entry.

The potato industry of the Islands is not very extensive as yet and still we have many areas on which good potatoes can be grown and which no doubt will be equal if not superior to the bulk of the shipments arriving here. Therefore great care should be exercised by every grower of potatoes to see to it that

his seed potatoes are absolutely free from scab and it is by far the safest way to first disinfect all seed potatoes whether scabby or not so as to kill the disease before introducing it into the ground, where once introduced, it will remain for years to come. Badly infested potatoes are readily detected, but at times the infestation is so slight that it is difficult to detect it even with a good microscope. Clean culture is another agent for the prevention of scab and on ranches where potatoes are grown, the stock, especially hogs, should not be fed the potato peelings, especially from potatoes brought from places where the scab is known to exist. For those who desire to free their potatoes from this disease and prevent its introduction into the fields the following remedies can be used:

Remedies for Potato Scab.

For small lots use:

1 pint Formaldehyde,
30 gallons water.

Put solution in half barrels and soak the potatoes for two hours. This should be done shortly before planting and before the potatoes are cut for seed.

For large lots use for a tight room of about 1,000 cubic feet the following:

23 ounces of Potassium Permanganate,
3 pints of Formaldehyde.

After stacking the potatoes in bags allowing plenty of space for the fumes to pass all around each sack—this can be done by placing 2x4 scantlings between each layer of sacks—the Permanganate of Potassium should be spread in a thin layer on the bottom of the vessel, then the Formaldehyde poured in and stirred quickly and then vacate the building and see to it that the door is thoroughly tight. The potatoes should be subjected to the fumes for at least 24 hours. Potatoes after treatment should not be put into old sacks or vessels which are liable to have spores of the scab, as all the work done will be without avail.

Summary.

Land which has produced scabby potatoes the previous year should not be planted for one or two years with potatoes.

All seed should be carefully treated as recommended above.

Scabby potatoes or portions thereof should never be fed to stock.

Barnyard manure if produced where scabby potatoes have been fed to stock should not be used as fertilizer for potato field. When once a field becomes infested with scab, rotation of crops other than root crops, is absolutely necessary. This requires from one to three years according to extent of infestation.

EDWARD M. EHRHORN,
Superintendent of Entomology.

BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY.

A meeting of the Board of Commissioners of Agriculture and Forestry was held at the Board room, in the Capitol, on Thursday, April 7, 1910, at 2:30 p. m.

Mr. Marston Campbell, President and Executive Officer, and Messrs. J. M. Dowsett and A. Waterhouse, members, were present.

In the absence from the city of H. M. von Holt and D. P. R. Isenberg, members, Mr. Albert Waterhouse was appointed on the committees on Entomology, Rules and Regulations, Agriculture, Animal Industry and Bee Industry.

Forest Reserves.

Mr. Campbell stated that the Governor had set May 30 as the date of the public hearing in reference to the Pupukeya-Paumalu forest reserve.

In regard to the Kohala forest reserve matter Mr. Campbell reported that the sum of \$24,280, contributed by the Kohala interests, to be at the disposal of the Board for the acquirement of 2,480 acres of the lands of Kehena II, is now being held up by certain requirements of the Kohala subscribers. After an investigation he found that the Kohala Ditch Company have the right of way across the lands of Kehena II for their ditches and reservoir sites and that they also have a right to the waters of Kehena II, in consideration of which the Woods Estate is granted 20,000 gallons of water per day from the ditch and tributaries. So far as the right of way of the ditch and reservoir sites is concerned there is no objection on the part of the Kohala people, but they do object to the water being granted. Mr. Campbell said that the waters of Kehena II amount to nothing, as in his opinion the water rights of the Kohala Ditch Company are of no value except for storm waters. Under an agreement made with these people the water would have to be put up at public auction. If the Board entered condemnation proceedings it might consider the franchise rights.

Mr. Dowsett said that he thought if the subscribers to this fund were given time and the Kohala Ditch Company made the matter clear to them, there would be no trouble, they being allowed to go on with their work and do all they can to provide water, of which they are very much in need. Any action taken by the Superintendent of Public Works must await the settlement of this question.

The executive officer stated that under the present restrictions the Superintendent of Public Works is without power to do anything, as requested by the Board of Commissioners.

Motion was made by President Campbell that all matters in connection with the Kohala forest reserve be deferred awaiting adjustment of the question of water rights between the Kohala Ditch Company and the Kohala interests, the subscribers to the fund. Carried.

President Campbell further reported that Mr. McCrosson of the Kohala Ditch Company had guaranteed a contribution by the company as follows:

That they will police the forest reserve in the district through which the Kohala ditch passes and keep the fences in repair. This means a contribution which continues for the entire life of their franchise—for fifty years, and will lessen the Board's expense by about \$60 per month. While it will cost the Kohala Ditch Company nothing, as they have their men there, it would be a great expense to the Government, and if the Kohala Ditch Company does not do this, the Board must. Mr. Campbell said that this would be equal to a contribution of \$720 per year for fifty years.

Any action in regard to the fencing and planting of the Kohala forest reserve was deferred until next meeting of the Board, at which time the Superintendent of Forestry is requested to be present.

Forestry Substations.

The Superintendent of Forestry submitted a special report to the Board outlining a scheme for the establishment of substations on the different Islands—this work of extension to be carried on as soon as there is on hand sufficient funds, also an outline for tree planting to be undertaken by the Territorial Government in the different localities.

Mr. Waterhouse stated that he approved of such recommendations, but before any action was taken the question of expense should be thoroughly gone into.

Mr. Campbell stated that the subnurseries and points of distribution they had already established were costing but little, as most of the work accomplished had been carried on by co-operative arrangements with several of the planting managers and others. He suggested, when this matter is ready for serious consideration, that the new substations be established with the idea of coöperation for bearing the burden.

Mr. Campbell said that by coöperation last Arbor Day, November 12, 1909, sixty thousand trees were distributed free of charge among individuals and corporations, on their application for same.

Reports.

Mr. Dowsett said that the report of Forest Inspector Louis Margolin on the possibilities of Ohia lumber, entitled, "The

Closer Utilization of Ohia," contained some very valuable information for publication.

Mr. Dowsett moved that the gold medal received by the Board from the Alaska-Yukon-Pacific Exposition at Seattle, for an exhibit of Hawaiian woods and botanical specimens, be deposited in the Territorial Archives. Carried.

It was moved that the regular monthly report of the Superintendent of Forestry be placed on file. Carried.

It was voted that the regular monthly report of the Superintendent of Entomology be placed on file and a copy sent to the editor of The Hawaiian Forester and Agriculturist for publication.

An itemized statement of the Board's finances was submitted by the Secretary and the same ordered placed on file.

Rules and Regulations.

Mr. Waterhouse stated that he would like permission from the Board to publish all of the laws of the Board of Agriculture and Forestry in pamphlet form, to be placed in the hands of the legislators. This will cost about \$100.

Mr. Dowsett moved that the rules and regulations of the Board of Agriculture and Forestry be compiled and printed in pamphlet form. There being no objections the motion was carried.

Animal Industry.

In regard to precedents, granted, for permission to land animals at Hana and Honuapo, which points lack facilities in the way of providing for the quarantine of live stock, Mr. Waterhouse said he did not believe in making any exception to the regular rules and regulations, but that the Board had best make new rules to satisfactorily cover all conditions and emergencies.

It was voted that the part of the Territorial Veterinarian's report referring to the landing of live stock at Hana and Honuapo be referred to the Committee on Animal Industry.

Communications.

The executive officer read letters pertaining to the work of the Division of Animal Industry as follows: From the Territorial Veterinarian to H. B. Elliot of Hilo, dated April 4, 1910, in regard to permission granted Messrs. Hind, Rolph & Company to land mules from the schooner Muriel at Honuapo; acknowledgments from T. H. Davies & Company, H. Hackfeld & Company, and Castle & Cooke to Dr. Norgaard's letter with copy of rules and regulations pertaining to the importation of live stock into this Territory; letter from the Territorial Veterinarian of April 1, to J. C. Fitzgerald of Kahului, Maui, in regard

to the arrival of mules consigned to the Kaeleku Sugar Company; letter of the Veterinary Inspector to A. D. Melvin of March 1, Chief of the Bureau of Animal Industry, Washington, D. C., with submittal of copies of the Territorial rules and regulations with amendments approved by the Governor controlling the introduction of domestic animals; also letter of March 18, 1910, from E. R. Stackable, Collector of Customs, U. S. Custom Service, acknowledging Territorial certificate of examination of certain animals and fowls imported by the Russian and Japanese immigrants.

Protection of Island Birds.

The President read a letter from Miss Annie M. Alexander of March 16, in which application is made, for herself and one assistant, for permit to collect for scientific purposes in connection with the work of the Museum of Vertebrate Zoölogy of the University of California, during the season of October 1, 1910, and March 1, 1911, twenty of each rare species of native birds of the Hawaiian Islands. Miss Alexander furnished a list of the birds desired. A letter was also read from Wm. A. Bryan, Professor of Zoölogy of the College of Hawaii, recommending that the members of the Board grant this permit.

Mr. Waterhouse stated that the Island birds were fast becoming extinct and the rare species should be protected.

Mr. Dowsett moved that this application for permit be held, pending further investigation as to the number of, and species, to be taken, and that the matter be referred back to the Superintendent of Forestry for consideration. Carried.

DIVISION OF FORESTRY.

Board of Commissioners of Agriculture and Forestry.

Gentlemen:—I have the honor to submit the following report of the work of the Division of Forestry for the past two months, my absence on a trip to Maui having prevented me from preparing the report for February at the usual time.

Forest Planting.

Plans looking to the planting with forest trees of considerable areas of government and privately owned land have had a large share of the attention of the Division of Forestry during the past two months. The first of this planting by the Government to be actually started, is on the three water reserves in the Pupukeya-Paumalu homestead tract, Koolauloa, Oahu. Following a call for tenders a contract for planting Water Reserves A and B was

made with the Oahu Plantation Company, Ltd., and for Lot C with Mr. C. G. Owen. Seedling trees furnished from the Government Nursery are now being set out in these lots.

Early in March the Superintendent of Forestry submitted a comprehensive outline of a plan for forest planting and tree distribution, to be put into effect as soon as money is available. Detailed plans for each locality where planting is recommended are now being drawn up. It is the intention of the Board to establish forest plantations at carefully selected points on each island. The localities recommended for initial work are the Pupukea-Paumalu Tract on Oahu, the Kohala Mt. Forest Reserve on Hawaii, the Polipoli and Waihou Spring Reserves on Maui, and the Papapaholahola Reserve at Kalaheo, Kauai.

It is further the intention of the Board to extend the general distribution of forest trees to the public by enlarging the existing sub-nurseries at Hilo and at Homestead, Kauai, and by establishing new stations in a number of other districts. Correspondence and the elaboration of details in regard to these matters has taken up considerable of my own time the last few weeks.

Plant Introduction.

Gradually the Experiment Garden in Makiki Valley is being got into shape so that it can be used to advantage. Shipments of seeds of plants new to the Territory are constantly being received. There is now on the way from the Orient a large consignment of both seed and plants sent by Mr. Gerrit P. Wilder, who as special agent of the Board is looking out for interests of the Territory during a visit to that part of the world.

Federal Tree Planting Experiments.

During March seed of some fifty kinds of mainland trees—conifers and broadleaf species—were planted in nurseries on the slopes of Mauna Kea and Haleakala and in the experimental plots on the higher slopes of those mountains. The seedlings that will result from these sowings will supplement the trees from mainland nurseries already set out. Among the kinds now being tested some should be found suitable for use under our local conditions. The species that are found to do well can then be planted on a large scale.

Eucalyptus Investigation.

During the greater part of February and the first half of March, Mr. L. Margolin, forest inspector, was on Maui making measurements in and studying the eucalyptus plantations on that island. He returned to Honolulu on March 17, when the working up of the figures and the compilation of the data collected was started. Mr. Margolin is at present on Kauai for a short

time to inspect the eucalyptus groves there. On his return he will prepare the report of his investigations, which will later be published as a bulletin of the Division of Forestry.

Work of the Botanical Assistant.

During February and the first part of March Mr. J. F. Rock, the botanical assistant of the Division of Forestry, has been at work identifying and examining specimens collected at previous times. He has now indexed and prepared notes on about half the material so far collected. The notes so made will form the basis of an "Enumeration of Hawaiian Plants," which it is expected will in due course be followed by other publications by the use of which the general public can learn to know more of the native plants.

Through the exchange of botanical specimens, the Herbarium has recently been enriched by a number of valuable additions, especially in the way of eucalyptus from Dr. J. H. Maiden, the government botanist of New South Wales.

Prize for Seattle Exhibit.

Early in March the Board received from the officers of the Alaska-Yukon-Pacific Exposition a gold medal, for the exhibit of Hawaiian woods and botanical specimens sent last summer to Seattle. The diploma accompanying the award has been framed and hung on the walls of the office; the medal itself, suitably inscribed, has been deposited in the Territorial Archives.

Tests of Locally Grown Eucalyptus.

Through a coöperative agreement worked out between this Division and the Oahu Railway and Land Company, some fifty trees each of three species of eucalyptus—blue gum, swamp mahogany and yate—have been felled on Tantalus, cut into eight foot lengths and hauled to the Oahu Railway and Land Co. yards. These logs are now being cut into ties. After being allowed time to season properly they will be laid at designated points along the road, under a variety of conditions.

In March 28, Mr. Margolin and I, in company with Mr. H. N. Denison, superintendent, and Mr. G. Hughes, road master, went over the line and worked out a definite plan for laying the ties. This experiment, the first that has been made with eucalyptus in Hawaii, should yield valuable data as to the worth of these species for tie purposes.

Eucalyptus Timbers to be Tested.

Looking further to securing accurate data in regard to the value of eucalyptus, a few additional trees of the three kinds mentioned above, together with the lemon scented gum (*E. citrio-*

dora) have also been felled and cut into logs. These will be hauled to town, sawn into squared timbers and delivered at the laboratory of the College of Hawaii for testing in the Riehle timber testing machine. The beams will be subjected to various tests which will show the strength of the wood and its adaptability for various uses. These figures will be published in due course.

Congressional Vegetable Seed.

Following the usual custom the Delegate to Congress has sent to the Board for local distribution his quota of the free Congressional vegetable seed. Packages have been made up and sent out to all the public schools having school gardens and to numerous individuals. Persons desiring seed will be supplied as long as the supply lasts, upon application to the Seed Clerk, Box 331, Honolulu, Hawaii. Only the following kinds of seed are available for distribution: Beans, collard, lettuce, muskmelon, okra, parsley, radish and turnip.

Forest Reserve Boundaries.

Mention has already been made of a trip to Maui, that occupied me from March 4 to 17. The object of this trip was principally to fix on the ground, for exact location by Mr. S. M. Kananui, government surveyor, the points of a proposed forest reserve in the Kula district. During my stay on Maui I was able also to attend to a number of matters in regard to existing forest reserves and forest planting.

Plans are now well in hand for the creation of two additional forest reserves on Oahu and Hawaii, more particularly the remnant of Government land above the Pupukea-Paumalu tract and a section of land near the bluff on one of the government lands now under lease to the Laupahoehoe Sugar Company, in North Hilo, which if reserved the Company has agreed to plant with forest trees. Reports in regard to both projects will shortly be submitted to the Board.

Very respectfully,

RALPH S. HOSMER,
Superintendent of Forestry.

DIVISION OF ANIMAL INDUSTRY.

Hon. Marston Campbell, President and Executive Officer, Board of Agriculture and Forestry.

Sir:—I beg to report on the work of this Division since the last meeting of the Board on March 14, as follows:

Inspection Service.

The circular letter addressed to agents and representatives of steamship and navigation companies which was approved by this

Board at its last regular meeting and which pertained to a stricter compliance on the part of certain officers and employees with the rules and regulations of this Board, has been distributed and the appended answers have been received.

A copy of the same letter was also sent to the Federal inspector in San Francisco, together with such information as may lead to the prevention of a repetition of the incident which necessitated the circular letter in question.

To further prevent the introduction of hog cholera and swine plague from California, a blank form of affidavit to be filled in and sworn to by the owner and shipper of swine intended for shipment to this Territory has been forwarded to Dr. Baker in San Francisco as per his request.

At the Quarantine Station on the Beach Road the following animals have been kept since the last meeting of the Board :

10 mules, Schuman Carriage Co., March 9 to April 1.

3 horses, Hawaiian Express Company, March 18 to April 2.

17 mules, Schuman Carriage Company, March 18 to date.

9 mules, Honolulu Plantation Co., March 18 to April 2.

The 17 mules which are still at the station will be shipped to Hilo as soon as transportation can be obtained for them. An application to ship them two days before the expiration of the quarantine period and to allow them to finish the said period at the Quarantine Station in Hilo had to be denied as the same steamer was to carry mules which had finished their quarantine.

Applications have been received and in accordance with precedence, granted, for permission to land 4 mules at Hana, Maui, and 16 mules at Honuapo, Hawaii, the same to be isolated and held for inspection at the owner's expense. Both of these shipments, the 4 by the schooner James Rolph and the 16 by the schooner Muriel will undoubtedly spend the principal part, if not the entire quarantine period, on board these sailing vessels, and it would therefore seem an unreasonable hardship to compel the owners to unload them at either Kahului (where no quarantine station has been built as yet, but where the rules allow their landing) or at Hilo, and in both cases necessitate a severe and risky, not to say expensive and cruel overland trip of several days duration. The appended letters to the Deputy Territorial Veterinarians of Maui and Hawaii (Dr. J. C. Fitzgerald, April 1st, and Dr. H. B. Elliot, April 4th), will show the precautions taken in order to prevent the introduction of any contagion with the animals in question. Mr. John Hind of the Hawi plantation has three times before been granted permission to land mules at Honuapo, in which cases the animals were inspected by either Dr. Elliot from Hilo (2 times) or by Dr. Fitzgerald, then assistant veterinarian, from Honolulu.

An opinion by the Board in regard to the further continuance of this practice would be appreciated by this office and a copy of

the rules with those paragraphs especially bearing upon the subject, plainly marked, is therefore appended.

The construction of a quarantine station on Maui and the removal and rebuilding of the present makeshift station at Hilo should also receive the consideration of the Board.

The following live stock, dogs and poultry, have arrived since the last meeting of the Board:

March 18—S. S. Wilhelmina, 6 horses.

March 18—S. S. Wilhelmina, 26 mules (17 Schuman, 9 Honolulu Plantation).

March 18—S. S. Wilhelmina, 5 crates poultry.

March 24—S. S. Mexican, 1 crate poultry.

March 25—S. S. Siberia, 2 crates poultry.

March 28—S. S. Korea, 1 crate poultry.

March 28—S. S. Korea, 1 dog.

March 30—S. S. Marama, 1 dog.

April 2—S. S. Sierra, 3 crates poultry.

April 2—S. S. China, 3 crates poultry.

As the S. S. Lurline is expected on April 6 with several large consignments of mules (in the neighborhood of 75 head) the new quarantine station will undoubtedly be tested as to its capacity unless the animals which are there now can be previously removed.

Glanders.

Live Stock Inspector Venhuizen has reported only two suspicious cases since the last report, neither of which proved to be glanders. Three suspects mentioned in a previous report have been cancelled from suspect list.

The following districts have been inspected:

Moiliili ..	5 times
Palolo Valley ..	1 "
Kapahulu and Waikiki.....	2 "
Kewalo and Kakaako	4 "
Kalihi ..	3 "
Nuuanu and Puunui.....	1 "
Pauoa Valley	2 "

All hack, dray, express and livery stables have been visited regularly and all streets in the business section of the city patrolled.

The glanders situation must therefore at the present time be considered as well under control.

In this connection it may be well to mention that preparations are now being made for the establishment of breeding pens for guinea pigs. These will be made at the quarantine station. With an abundant supply of guinea pigs the positive diagnosis of glanders can, as a rule, be made in a shorter time than by any other method, and in cases where litigation might ensue the guinea pig test is universally accepted as most reliable.

Live Stock Sanitary Condition in the Territory.

The three Deputy Territorial veterinarians all report satisfactory conditions among the live stock in their districts, both among work stock and food producing animals. No cases of glanders have occurred on either Hawaii or Maui for a considerable period, but tuberculosis seems to prevail to some extent among the dairy cattle on Kauai. The local deputy reports having tested with tuberculin a large herd, 25 per centum of which reacted and were destroyed.

Dr. Fitzgerald of Maui, reports having just finished a large well equipped veterinary hospital at Camp 5 (Puunene) on the Hawaiian Commercial Sugar Company's plantation. This makes the third hospital on the Baldwin plantation (Paia, Camp 1 and Camp 5), which has been established since he took charge of the live stock sanitation of Maui. His efforts in having the old and unsanitary stables replaced with new and modern ones have also been rewarded and there can be little doubt that the extra disbursements and the amount of care which a number of the Maui plantations have been induced to expend on their work stock will be fully repaid through prolonged and more efficient service from each individual animal—a result which it would be well worth while for all plantations and other owners of work stock to emulate.

Correspondence.

A number of letters pertaining to the work of the Division and with the answers attached are appended for the information of the Board.

Very respectfully,

VICTOR A. NORGAARD,
Territorial Veterinarian.

 DIVISION OF ENTOMOLOGY.

Honorable Board of Commissioners of Agriculture and Forestry.

Gentlemen:—I respectfully submit my report of the work of the Division of Entomology for the month of March.

Of 27 vessels boarded we found fruit, plants and vegetables on 18. All shipments received the usual rigid inspection and were disposed of as follows:

<i>Disposal with Principal Causes.</i>	<i>Lots.</i>	<i>Parcels.</i>
Passed as free from pests.....	449	8750
Fumigated before releasing	14	31
Burned	5	5
Total	468	9786

Pests Intercepted.

On a shipment of palms and other plants from the mainland we found aphids and a few slugs. Each plant was carefully gone over and all moss and soil removed after fumigation.

On three shipments of orchids from Manila we found some snoutbeetles, 2 species of ants, 2 species of roaches, several spiders and a small scorpion. Fumigation killed all these, but we carefully overhauled every plant so that nothing should remain hidden among roots and foliage.

On March 12th I received a very large shipment of ladybirds (*Hippodamia convergens*), 150,000 in all, and considerable time was spent liberating these in suitable places. Fifty thousand were sent to the inspector at Hilo, Brother M. Newell, with instructions to liberate at various altitudes, and the following report has been received from him:

Hilo, Hawaii, March 27, 1910.

Mr. E. M. Ehrhorn, Supt. Entomological Inspection, Honolulu.

Dear Mr. Ehrhorn:—I herewith give you an account about the distribution of the 50,000 ladybirds I received from you on Wednesday, March 16.

I was anxious to dispose of them as soon as possible, and also to liberate them on the best feeding grounds. Fortunately, being well acquainted with all localities around here, I lost no time and went to work at once. First I established many colonies in and around Hilo. On Saturday, March 19, I procured a rig and worked along the government road through Olaa as far as Glenwood. Along this road are numerous citrus groves, and finding all of them badly infested with aphids, I established numerous and strong colonies amongst them. After reaching Glenwood I worked amongst the orange groves there. I sent several colonies with trustworthy parties to be liberated in the vegetable gardens around the Volcano.

I thus established numerous colonies, extending in a line of thirty-two miles, and into the forest belt, where they have a chance to hibernate should the climate suit them. After a few months I intend to visit the citrus groves again and see what became of the ladybirds, and let you know results.

Yours truly,

B. M. NEWELL.

Of the remaining 100,000, I sent 15,000 to Kauai and about 80,000 were distributed on Oahu, selection being made of the plains and higher valleys, reinforcing some of the colonies liberated last month. In such large shipments we must necessarily expect quite a percentage of dead ones, and I should estimate these at about 5,000.

A further shipment of material containing the parasite of the cabbage butterfly, *Pteromalus puparum*, has been received and the following distributions made of both sendings:

215 parasites liberated at Wahiawa and Leilehua.

575 parasites liberated at Honolulu and vicinity.

From the first lot of parasites received we made a successful check test of breeding in the laboratory. We find that it takes from 14 to 15 days from the time the parasite deposits its eggs in the pupa of the cabbage butterfly until the new parasites issue again. This is indoors and no doubt in this climate the same or very nearly the same time will be necessary for outdoor breeding. Preparations have been made for further rearing of parasites in the laboratory so as to enable us to continue distribution. Owing to the delicate structure of these parasites no attempt was made to send any to the other islands, but we shall be able to do this later on.

In my report of January I mentioned to Mr. Koebele the necessity of searching for some of the parasites received in previous years so as to know which have actually established themselves. I desire to report that during the liberation of the *Hippodamias* I took the opportunity of search offered and am pleased to report that we found two species of ladybirds, *Azya luteipes*, which were liberated about July, 1908, and *Hyperaspis pocosa*, which was also liberated in 1908. Both these are scale destroyers and a very good addition to the many beneficial insects we now have with us. They had not been collected before.

Nothing further has been received from Mr. A. Koebele, and Mr. O. H. Swezey is continuing the breeding of the hornfly parasite which we last received and which is, to say the least, a very slow process.

Owing to the late arrival of the *Enterprise* at Hilo I have not received Bro. Newell's report up to this writing, but should it arrive before the meeting of the Board I shall attach it to this.

Very truly yours,

EDW. M. EHRHORN,
Superintendent of Entomology.

THE CLOSER UTILIZATION OF OHIA LUMBER.

BY LOUIS MARGOLIN.

Forest Examiner, U. S. Forest Service.

Although a dozen or more different species of trees are used more or less locally for various purposes on the Hawaiian Islands yet the ohia lehua and the koa are the only two lumber trees in this Territory which, because of their size and abundance, have any commercial importance. Of these two species koa is primarily a cabinet wood leaving ohia lehua as the only all around lumber tree of any importance.

Ohia lehua occurs in one form or another on all the islands of the group, between elevations of 1,500 and 6,000 feet. It reaches its principal development in the Puna, Hilo and Kona districts on the Island of Hawaii, where it occasionally attains to a height of 100 feet and a breast-high diameter of 40-50 inches. In the districts named it forms extensive, practically pure, forests.

The ohia wood is strong, heavy, tough, hard, and close-grained, of a dark reddish or brown color, and takes an excellent polish. Unless carefully seasoned it is liable to check, twist and warp to an extent which renders it useless for lumber. The thoroughly dry wood has a specific gravity of .64, weighing 40 lbs. to the cubic foot. It is thus slightly lighter in weight than shagbark hickory of the Middle States, which weighs 40½ lbs. per cubic foot, and is somewhat heavier than red or white oak which weighs 38 lbs. per cubic foot. Green ohia wood, however, is very heavy, weighing 70 lbs. or more to the cubic foot.

Ohia is only about one-half as tough as good hickory, but in strength it may be classed with the best oak wood. Thoroughly dried heartwood will last for a long time in contact with the soil, ties 15 or 16 years old showing hardly any sign of decay. The green wood, however, is not very durable. The wood has excellent spike-holding qualities which render it of great value as a tie timber.

In the past the wood was used for idols, the construction of log houses, and for fuel, but for few other purposes. In recent years its use as a valuable tie timber has been recognized, and two logging operations in the Puna district cut practically all their timber into ties, most of which are shipped to the coast.

In spite of the low stumpage price paid for the standing trees and the liberal price received for ohia ties on the coast, the cost of manufacture leaves little or no profit. This is due to various causes, but mainly to the per cent. of cull timber, the difficulties in logging, and the high cost of transporting the heavy logs and ties. An operation to prove a financial success, must, therefore, depend almost entirely on the utilization of the by-products for

its profits, and an ohia tie proposition will pay according as the slabs, sidings, and crooked and defective logs are utilized for commercial purposes, at a profit.

The wood of ohia lehua, if properly seasoned, may be used for almost any purpose for which hardwood is ordinarily used, and with the growing scarcity of such wood on the continent there should be no question about finding a ready market for it. However, in introducing a new wood in the lumber market numerous



Clearing a right-of-way for a logging railroad in the ohia forest

obstacles are encountered, the greatest of which is to overcome the indifference or the suspicion of the lumbermen. It must be proved to the prospective user that the product is not only as good as, but is superior to the wood which it is to substitute. The product should be worked up in the most careful manner, for any shortcoming or defect in the manufacture will be attributed as a defect to the qualities of the wood itself.

The above statements are almost axiomatic but seem to be necessary in view of the circumstances surrounding the only two attempts to introduce this wood on the market. An attempt was

made to utilize ohia lumber for insulator pins on telephone and telegraph poles. The green wood, (probably sap wood), was used for this purpose, and after the pins were turned and delivered on the coast they warped and twisted so badly that they were entirely unfit for the use for which they were intended.



Felling ohia trees (note woodhopper in the lower left of picture),
Puna, Hawaii.

Again, an attempt was made to use ohia for paving blocks. The main qualities necessary in a good paving block are durability, close-grain, and the power of resisting abrasion. These qualities are found to a high degree in the ohia. However, no care was used in laying the blocks and in covering them, with the result that the ohia blocks were declared to be unsuited for paving because such pavements were found to be slippery. There is no

doubt that a proper surface covering would have easily obviated this drawback.

The principal difficulty found in introducing ohia lumber on the market is the indisputable fact that it is very liable to warp and twist. Means of overcoming this difficulty, however, can be readily found. Great attention should be paid to piling and drying the lumber. An important requirement is that the boards should be piled in such a manner as to allow a free circulation of



Loading ohia logs.

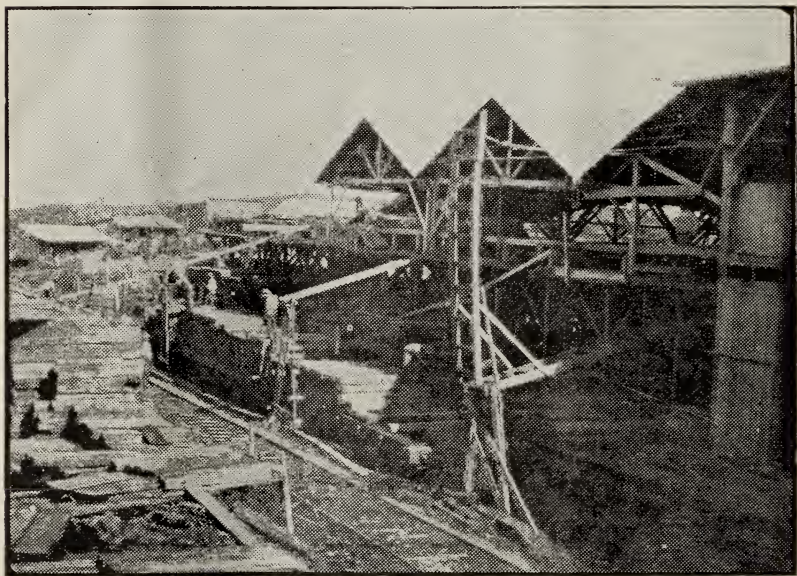
air. The lower tier of boards should be laid about 8 inches apart, while the boards in the upper layers may be only 3 inches apart. The piles should not be more than 6 feet wide. The layers of boards should be separated from each other by means of strips or stickers about an inch square and laid 2 feet apart. To prevent staining the stickers should be thoroughly dry. The top of the pile should be weighed down with ties or heavy blocks, or better still, the lumber should be piled in a roofed shed and the pile should be pressed down by means of jack-screws working between the upper layer of the boards and the roof of the shed.

To prevent too sudden drying and consequent checking, the lumber should not be piled in full sunshine or in very windy places.

By using these methods of piling the lumber and then allowing it to stand in the yard for from 3 to 6 months the tendency to warp and twist would be eliminated to a large extent.

Properly seasoned ohia wood can be used for a great many purposes, some of which will be enumerated.

Ties.—As mentioned, most of the ohia cut at present goes into ties. It is particularly valuable for this purpose on sharp curves



Loading ohia ties on railroad cars. Pahoa.

because of its resistance to spike-pulling. If properly dried before being laid it has great durability in contact with the ground.

Timbers.—Ohia timbers, although very heavy, are excellent for the construction of bridges, tunnels, and for other purposes where strong durable wood is required.

Car Construction.—Ohia has been used with apparent success for railroad car construction. Its strength, toughness and hardness make it a valuable wood in the car shop. It is especially useful for the construction of various portions of the lower part of the cars.

Flooring.—The close, attractive grain, the pleasing dark color, and the hardness of the wood render ohia very suitable for flooring purposes. If properly seasoned there is no reason why ohia

flooring should not be able to compete with any hard wood flooring at present on the market. The wood has already been used for this purpose to a limited extent and promises to give highly satisfactory results.

Wainscoting and Paneling.—The attractive grain and color of the ohia should render it suitable for wainscoting and paneling. Its successful use for this purpose, however, will depend on the care with which the wood is seasoned.

Interior Finishing.—The qualities of the wood which make it suitable for flooring and paneling make it also a good wood



A corner of the slab pile, where valuable ohia lumber is sold for firewood.

for other interior finishings. Houses finished in ohia are said to be very attractive and pleasing to the eye.

Stair Railings and Columns.—The ease with which the wood takes a polish and its hardness make it a suitable wood for stair railings and columns.

Molding.—Attractive molding and picture frames can be made from ohia wood, and narrow boards and strips unsuitable for any other purpose may thus be utilized with a profit.

Shingles.—Ohia shingles have been used to a certain extent in the construction of houses at Pahoā in the Puna districts. Shingles a year old have not as yet warped to any extent. Heartwood should be utilized for this purpose, since the sap wood even if dried is liable to take up water and warp.

Turning and Novelties.—Small pieces of ohia unfit for other purposes may be utilized to a certain extent for various turning purposes such as dowells, pail handles, bobbins, toys, calabashes, etc.

Shuttles.—Dogwood, in the States, is the principal wood used for shuttles for cotton and textile mills. The exhaustion of this wood at present in sight has caused more or less concern, and any substitute for this wood will find a ready market. Ohia should furnish an excellent wood for shuttles.

Furniture.—Because of the great weight of ohia wood and its glassy finish it is not suitable for ordinary furniture. However, small articles of furniture such as card tables, are sometimes made of this wood, and find favor in various localities.



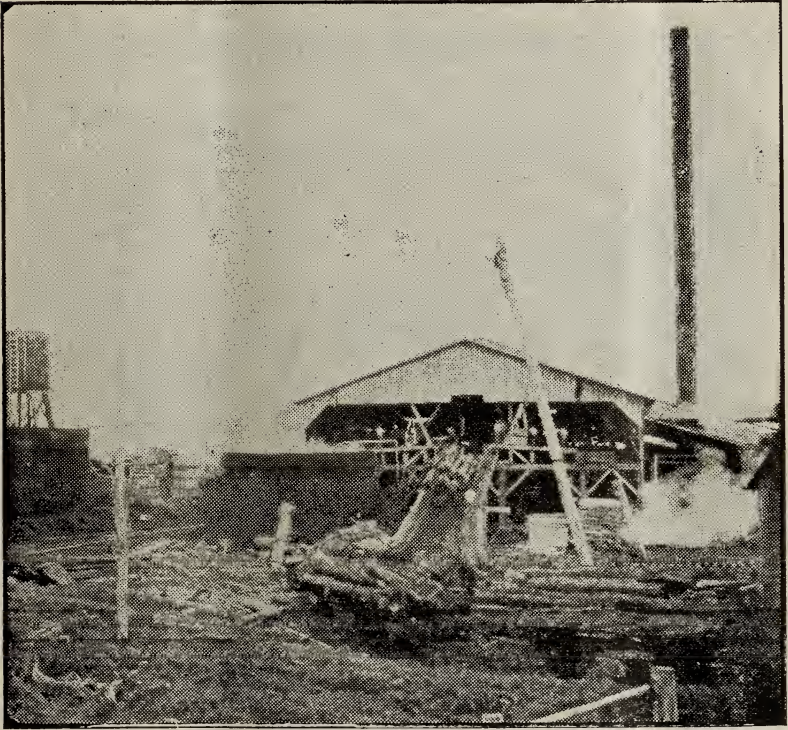
Attractive, serviceable houses built with ohia shingles. Pahoehoe.

Paving Blocks.—The qualities which make ohia suitable for street paving blocks have already been mentioned. Ohia should be able to compete for this purpose with almost any other woods at present in use.

Tool Handles.—The toughness and strength of ohia make it a fit wood for handles of small tools such as screw drivers, chisels, planes, etc. Its great weight, however, renders it unsuitable for the handles of axes, spades, shovels, and other large implements. By experience it has been found to give satisfaction as handles for peavies or cant-hooks, used in logging operations.

Pully Blocks.—Its use for pully blocks should be thoroughly tested. Apparently it has all the requirements necessary for such a purpose.

Tight Cooperage.—Old white oak, at present, is the principal and practically the only wood used for tight cooperage, especially for beer, whiskey and oil barrels. The constantly decreasing supply of this lumber is becoming a serious problem in the cooperage market and any practicable substitute would be gladly received. General consideration seems to show that ohia lumber possesses qualities which make it suitable for purposes of tight cooperage, and the lumber should be given a thorough trial.



Ohia tie mill. Pahoehoe.

Tie Plates.—A new use for ohia has recently been introduced which, if proved a success, should find a market for large quantities of ohia lumber. This is its use for tie plates. Red wood, cedar, and other soft conifers make excellent ties so far as their resistance to decay and their durability in contact with the soil is concerned. But because of the softness of these woods the rails soon cut into them, the spikes pull out, and the ties must be shifted or replaced. To obviate this difficulty metal tie plates of various forms have been devised, which are fastened to the soft ties and receive the direct pressure of the rails. Such metal

tie plates are expensive, besides being not entirely satisfactory in other respects. Tie plates made of ohia lumber have recently come into use in Hawaii. These consist of boards about an inch thick, a foot long, and as wide as the tie, grooved to receive the rail, and provided with two holes for spikes. The hardness, strength and durability of ohia are qualities which render it a suitable material for tie plates. Great care should be taken, however, that the wood used for this purpose is thoroughly seasoned, for otherwise the plates will warp or break.



Camp of Japanese loggers.

Every effort should be made to introduce ohia lumber to the coast. It is by far too good a wood to be sawed into ties. It should be able to compete with almost any hard wood at present on the market for purposes in which strength, hardness, durability and attractiveness are the leading requirements. This introduction can be accomplished by wider advertisement, and especially by introducing into the market the finished products. The importance of having these products properly manufactured and free from defects cannot be emphasized too strongly.



Anyone sending a sketch and description may quickly ascertain our opinion free whether an invention is probably patentable. Communications strictly confidential. **HANDBOOK** on Patents sent free. Oldest agency for securing patents.

Patents taken through Munn & Co. receive special notice, without charge, in the

Scientific American.

A handsomely illustrated weekly. Largest circulation of any scientific journal. Terms, \$3 a year; four months, \$1. Sold by all newsdealers.

MUNN & Co. 361 Broadway, New York
Branch Office, 625 F St., Washington, D. C.

Garden and Farm Tools and Implements

To do good farming you must have up to date tools to work with. We carry a most complete line of everything needed by the small or large farmer, from the smallest hand trowel to the largest cane plow. We also have a good assortment of Hand, Bucket or Barrel Sprayers. Our assortment of Hoes, Shovels, Spades, Mattocks, Rakes, Garden Shears, Lawn Mowers, Garden Hose, and other things that are needed daily about the farm or garden, is most complete and our stock large.

E. O. HALL & SON, LTD.

Office: Brewer Building, Queen St.
Works Iwilei,

Telephone 430.
Telephone 272.

The Hawaiian Fertilizer Co., Ltd.

HONOLULU, HAWAII.

MANUFACTURE AND DEAL IN ALL KINDS OF
Fertilizer and Fertilizer Ingredients
INCLUDING:

Bone Meal,	Sulfate Ammonia,
Nitrate Soda,	Sulfate Potash,
Double-Superphosphate,	Dissolved Guano,
Ground Limestone, etc., etc.	

BOARD OF DIRECTORS:

Chas. M. Cooke, President,	E. F. Bishop, Treasurer,
E. D. Tenney, Vice-President,	J. Waterhouse, Secretary,
Geo. H. Robertson, Auditor,	
W. M. Alexander	
C. H. Atherton,	
E. F. Bishop, Managing Director.	
Norman Watins, General Superintendent	

The products of this company are equal in every respect to any fertilizers sold in any market. In none of the conditions are they ranked by those manufactured elsewhere.

We will be pleased to furnish analysis of the soil of any locality in the Territory and make special fertilizers for different soil products arranging the composition to suit conditions.

Prices and Terms on Application.

Board of Agriculture and Forestry.

PUBLICATIONS FOR DISTRIBUTION.

Any one or all of the publications listed below (except those marked *) will be sent to residents of this Territory, free, upon application to Mailing Clerk, P. O. Box 331, Honolulu.

BOARD.

- Report of the Commissioner of Agriculture and Forestry for 1900; 66 pp.
Report of the Commissioner of Agriculture and Forestry for 1902; 88 pp.
* First Report of the Board of Commissioners of Agriculture and Forestry, from July 1, 1903, to December 31, 1904; 170 pp.
Second Report of the Board of Commissioners of Agriculture and Forestry, for the year ending December 31, 1905; 240 pp.; 8 plates; 10 text figures.
Third Report of the Board of Commissioners of Agriculture and Forestry, for the year ending December 31, 1906; 212 pp.; 3 plates; 4 maps; 7 text figures.
Fourth Report of the Board of Commissioners of Agriculture and Forestry, for the calendar year ending December 31, 1907; 202 pp.; 7 plates.
Fifth Report of the Board of Commissioners of Agriculture and Forestry, for the calendar year ending December 31, 1908; 218 pp.; 34 plates.
"Notice to Importers," by H. E. Cooper; 4 pp.; 1903.
"Digest of the Statutes Relating to Importation, Soils, Plants, Fruits, Vegetables, etc., into the Territory of Hawaii." General Circular No. 1; 6 pp.
"Important Notice to Ship Owners, Fruit Importers and Others. Rules and Regulations Prohibiting the Introduction of Certain Pests and Animals into the Territory of Hawaii." General Circular No. 2; 3 pp.; 1904.
"Law and Regulations, Importation and Inspection of Honey Bees and Honey." General Circular No. 3; 7 pp.; 1908.
"The Hawaiian Forester and Agriculturist," a monthly magazine. Vols. I to VI; 1904-1909. To be obtained from the Hawaiian Gazette Co., Honolulu. Price \$1 a year.

DIVISION ON ENTOMOLOGY.

- "The Leaf-Hopper of the Sugar Cane," by R. C. L. Perkins. Bulletin No. 1; 38 pp.; 1903.
* "A Catalogue of the Hemipterous Family Aleyrodidae," by G. W. Kirkaldy, and "Aleyrodidae of Hawaii and Fiji with Descriptions of New Species," by Jacob Kotinsky. Bulletin No. 2; 102 pp.; 1 plate; 1907.
* "On Some Diseases of Cane Specially Considered in Relation to the Leaf-Hopper Pest and to the Stripping of Cane," by R. C. L. Perkins. Press Bulletin No. 1; 4 pp.; 1904.
"A Circular of Information," by Jacob Kotinsky. Circular No. 1; 8 pp.; 1905.
"The Japanese Beetle Fungus," by Jacob Kotinsky and B. M. Newell. Circular No. 2; 4 pp., cut; 1905.
Report of the Division of Entomology, for the year ending December 31, 1905. Reprint from Second Report of the Board; 68 pp.; 3 plates; 10 text figures.
Report of the Division of Entomology, for the year ending December 31, 1906. Reprint from Third Report of the Board; 25 pp.; 7 text figures.
Report of the Division of Entomology, for the year ending December 31, 1907. Reprint from Fourth Report of the Board; 18 pp.; 1 plate.
Report of the Division of Entomology, for the year ending December 31, 1908. Reprint from Fifth Report of the Board; 26 pp.; 2 plates.

DIVISION OF FORESTRY.

- * "Forest and Ornamental Tree Seed for Sale at Government Nursery." Press Bulletin No. 1; 3 pp.; 1905.
* "Suggestions in regard to the Arbor Day Tree Planting Contest." Press Bulletin No. 2; 7 pp.; 1905.
"An Offer of Practical Assistance to Tree Planters." Circular No. 1; 6 pp.; 1905.
"Revised List of Forest and Ornamental Tree Seed for Sale at the Government Nursery." Press Bulletin No. 3; 4 pp.; 1906.
* "Instructions for Propagating and Planting Forest Trees." Press Bulletin No. 4; 4 pp.; 1906.
"Instructions for Planting Forest, Shade and Ornamental Trees." Press Bulletin No. 5; 7 pp.; 1909.
"Na Hoakaka no ke Kanu Ana i na Laau Malumalu ame na Laau Hoohiwahiwa." Press Bulletin No. 6; 8 pp.; 1909.
Report of the Division of Forestry, for the year ending December 31, 1905. Reprint from Second Report of the Board; 77 pp.; 5 plates.
* Report of the Division of Forestry, for the year ending December 31, 1906. Reprint from Third Report of the Board; 123 pp.; 4 maps.
Report of the Division of Forestry, for the year ending December 31, 1907. Reprint from Fourth Report of the Board; 70 pp.
Report of the Division of Forestry, for the year ending December 31, 1908. Reprint from Fifth Report of the Board; 85 pp.

** This Bulletin will be sent only to persons interested in the subject.

* Out of print.

Board of Agriculture and Forestry.

PUBLICATIONS FOR DISTRIBUTION—Continued.

DIVISION OF ANIMAL INDUSTRY.

- * "Inspection of Imported Live Stock." Rule 1; 1 p.; 1905.
- * "Inspection and Testing of Imported Live Stock for Glanders and Tuberculosis." Rule 2; 1 p.; 1905.
- "Concerning Glandered Horse Stock in the Territory." Rule 3; 1 p.; 1905.
- * "To Amend Rule 1, Inspection of Imported Live Stock." Rule 4; 1 p.; 1907.
- "Rules and Regulations, Inspection and Testing of Live Stock." Rules and Laws; 11 pp.; Revised; 1910.
- "Quarantine of Horse Stock from California." Rule 8; 1 p.; 1908.
- Report of the Division of Animal Industry, for the year ending December 31, 1905.
Reprint from Second Report of the Board; 62 pp.
- Report of the Division of Animal Industry, for the year ending December 31, 1906.
Reprint from Third Report of the Board; 41 pp.; 3 plates.
- Report of the Division of Animal Industry, for the year ending December 31, 1907.
Reprint from the Fourth Report of the Board; 104 pp.; 6 plates.
- Report of the Division of Animal Industry, for the year ending December 31, 1908.
Reprint from Fifth Report of the Board; 44 pp.

DIVISION OF FORESTRY.

FOREST AND ORNAMENTAL TREE SEED AND SEEDLINGS FOR SALE AT THE GOVERNMENT NURSERY.

The Division of Forestry keeps constantly on hand at the Government Nursery, seed and seedlings of the important native and introduced trees. These are sold at prices just covering the cost of collection or growing.

The list includes both forest and ornamental trees, such as Silk Oak, Koa, various species of Eucalyptus, Golden and Pink Showers, Pride of India, Poinciana, Albizzia, etc. The price of the seed varies from 10 to 50 cents per ounce. The seedlings may be had for 2½ cents each, except a few kinds which are 5 cents. Seed of the various palms is also for sale; the price per 100 varying from \$1.00 to \$2.50. All seed is tested before being sent out, which insures its being good.

All communications in regard to seed or trees should be addressed to David Haughs, Forest Nurseryman, Box 331, Honolulu, Hawaii.

RALPH S. HOSMER,
Superintendent of Forestry.

DIVISION OF ENTOMOLOGY.

To give information about insects free of charge is one of the duties of this Division and Hawaiian readers are hereby invited to make inquiry in person and by mail. In order to be able to advise intelligently or send the right kind of useful insects for relief we like and sometimes it is indispensable for us to see the insect suspected or caught in the act, also specimens of the injury. In a tin with a hole or two, or a wooden box specimens may be mailed at 3rd class rates. When specimens are not accompanied by letter *always* write your name and address in the upper left-hand corner of the package. Address all communications SUPERINTENDENT DIVISION OF ENTOMOLOGY, P. O. BOX 331, HONOLULU, HAWAII.

EDW. M. EHRHORN,
Superintendent.

VOL. VII

MAY, 1910

No. 5

Price, 10c. Per Copy; Per Annum, \$1.00; Foreign, \$1.25.

THE
Hawaiian Forester
AND
Agriculturist

A MONTHLY MAGAZINE

OF

Forestry, Entomology and Agriculture

ISSUED UNDER THE DIRECTION

OF THE

BOARD OF COMMISSIONERS OF AGRICULTURE
AND FORESTRY.

PUBLISHED MONTHLY.

Entered as second-class matter at the Post office, at Honolulu, Hawaifi.

ADDRESS ALL COMMUNICATIONS TO

DANIEL LOGAN,
EDITOR "THE FORESTER,"

P. O. BOX 366,
HONOLULU, H. T.

For business relating to advertising or subscriptions, address

HAWAIIAN GAZETTE CO., LTD., Publishers,
VON HOLT BLOCK, 65 S. KING ST., HONOLULU, HAWAII.

CONTENTS:

	Page
Editorial.....	127
Pupukea Forest Reserve.....	128
Board of Agriculture and Forestry.....	131
Division of Animal Industry	133
Division of Forestry.....	136
Division of Entomology.....	140
Department of Public Lands.....	141
Report on Rice, etc. (Krauss).....	143
The Meaning of Conservation (Hosmer).....	152
Proclamation of Forest Reserve, etc.....	164

OFFICERS AND STAFF OF THE BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY.

COMMISSIONERS.

Marston Campbell, *President and Executive Officer.*
J. M. Dowsett P. R. Isenberg
H. M. von Holt

DIVISION OF FORESTRY.

Ralph S. Hosmer, *Superintendent of Forestry and Chief Fire Warden.*
David Haughs, *Forest Nurseryman.*
Joseph F. Rock, *Botanical Assistant.*
Louis Margolin, *Forest Inspector.*
David Kapihe, *Forest Ranger for Tantalus.*

DIVISION OF ENTOMOLOGY.

Edward M. Ehrhorn, *Superintendent of Entomology and Chief Inspector.*
 Albert Koebele, *Consulting Entomologist.*
 *Assistant Entomologist.*
 D. B. Kuhns, *Inspector's Assistant.*
 Louis Lewis, *Assistant in Inspection.*
 Fred Muir, *Beneficial-Insect Collector.*
 Bro. M. Newell, *Fruit and Plant Inspector, Hilo, Hawaii.*
 Robert R. Elgin, } *Honorary Fruit* { *Mahukona, Hawaii.*
 W. O. Aiken, } *and Plant Inspector* { *Kahului, Maui.*
 W. D. McBryde, } *at* { *Koloa, Kauai.*
 Dr. W. B. Deas, } { *Hana, Maui.*
 Wm. Robb, } { *Lahaina, Maui.*

DIVISION OF ANIMAL INDUSTRY.

Victor A. Nörgaard, *Superintendent of Animal Industry and Territorial Veterinarian.*
L. N. Case, *Assistant Territorial Veterinarian.*
John Vanhuizen, *Live Stock Inspector.*
J. C. Fitzgerald, *Deputy Territorial Veterinarian for Maui.*
H. B. Elliot, *Deputy Territorial Veterinarian for Hawaii.*
A. R. Glazzyer, *Deputy Territorial Veterinarian for Kauai.*

SECRETARY TO THE BOARD.

Miss Elsie M. Kuhn

CLERK AND STENOGRAPHER.

Miss Melika Peterson

EDITOR OF THE "FORESTER."

Daniel Logan

LIBRARIAN.

Miss Ella K. Dayton

THE HAWAIIAN FORESTER *and* AGRICULTURIST

VOL. VII

MAY, 1910

No. 5

Hawaii is attracting increased attention throughout the world of tropical agriculture. Exchanges from almost every quarter of the globe frequently make reference to information contained in this little magazine, sometimes giving copious extracts from official reports and contributions of specialists found in its pages from month to month.

In this number appears the first instalment of an exhaustive report by Mr. Krauss, the agronomist of the Hawaii Experiment Station, upon his official rice investigations. His account of observations in China and Japan are highly interesting, and it will be seen that his visit to the Orient promises valuable results to Hawaii in other lines of agricultural development as well as the rice industry.

Mr. Hosmer in this number gives an exhaustive presentation of the conservation cause. It is a matter that means a great deal more for Hawaii than is at present realized. Federal experts employed by the Territorial government have already started practical conservation work in these islands. The scheme of reclamation thus begun is a fitting counterpart of the forestry system, now some years old, which is not only creating great natural wealth for the future, but has already yielded valuable returns. By utilizing matured forest growth for marketing purposes, while conserving the immature growth and extending the forest area by continuous new planting, the service has demonstrated the value of both sides of scientific forestry.

It is gratifying to note the approval the Garden Island (the Kauai newspaper) has accorded to the article on "Coöperative Cultivation" in the April number of The Forester and Agriculturist. The desire of the Department is to make this magazine practically useful to the small farmer in every branch of husbandry, as well as furnishing the official record of government encouragement to agriculture, animal industry and forestry.

PUPUKEA FOREST RESERVE.

On Saturday morning, April 30, 1910, there was held in the office of the Board of Agriculture and Forestry in Honolulu, by the Governor of the Territory and representatives of the Board, a public hearing to consider the creation of a forest reserve above the Pupukea-Paumalu Homestead Tract, in the District of Koolauloa, Oahu. A number of persons appeared in favor of the creation of the reserve; no one in opposition.

Following the usual procedure there is printed herewith, for permanent reference, the report of the Superintendent of Forestry in regard to this proposed reserve, with a petition showing the feeling of the homesteaders in this matter. The official proclamation of the Pupukea Forest Reserve, signed by the Governor, is also given in full.

REPORT OF THE SUPERINTENDENT OF FORESTRY.

Honolulu, April 14, 1910.

Board of Commissioners of Agriculture and Forestry.

Gentlemen:—I beg to submit the following report on the setting apart as a forest reserve of the tract of unleased government land above the Pupukea-Paumalu Homesteads in the District of Koolauloa, Island of Oahu.

Following its definitely announced policy, it is the intention of the Board of Agriculture and Forestry to extend the existing forest reserves on Oahu so as to include the section that now remains under forest at the northwest end of the Koolau Mountain range. The greater part of this section is privately owned land. Part of it is already efficiently protected by forest fences, maintained by sugar plantation and other companies. Later it is expected that the greater part, if not all of the remainder, will be handled in a similar way. The tract now proposed to be set apart is an isolated remnant of government land, which it is believed will be of more benefit to the people of the Territory if maintained under a forest cover than if used in any other way. Accordingly it is recommended that the necessary steps be taken to have it created a forest reserve.

The proposed reserve is the irregular triangle lying above the Pupukea-Paumalu Homesteads between the privately owned lands of Kaunala and Waimea. The upper boundary of the mauka homestead lots has an elevation of approximately 900 feet; the mauka corner of Paumalu, Puu Moa, where Kaunala and Waimea join, is about 1350 feet.

On either side of the tract the boundary follows a well defined ridge which, when fenced from the mauka corners of the homesteads, for a distance of approximately 5,000 feet on one line and 4,000 feet on the other, will effectively shut off stock from the reserve. It is the intention of the government to build these fences in the near future.

The mauka portion of the reserve is densely wooded, as are also, at that elevation, the adjoining private lands. The forest consists of Ohia lehua and Koa, with considerable Lauhala in the lower part and a scattering of other Hawaiian trees, including some Iliahi (Sandalwood). On the sides of the gulches there is a good growth of young Koa and in general the forest is in satisfactory condition. Along the makai boundary of the reserve, on the ridges, are some small open flats that ought to be planted with trees while at the lower end of some of the gulches is land where tree growth should be encouraged. Practically all of the section proposed to be reserved is on the land of Paumalu. The area is given by the Survey Office as 790 acres.

Along with the mauka land it is recommended that there also be included as parts of the forest reserve the three water reserves in the Homestead tract, known as A (13.33 acres), B (13.4 acres) and C (47.1 acres). These water reserves are now being planted up with forest trees by the Board of Agriculture and Forestry under contracts recently made with persons at Pupukea. Setting them apart as portions of the Forest Reserve will enable the Department more efficiently to protect and care for these lots.

The object of the reserve is by protecting the forest to increase the flow from several small springs and waterholes on the land, which in former times are said to have yielded a considerable supply. With the development of the lower agricultural lands it is essential that all reasonable measures be taken to safe-guard and if possible to increase all the existing sources of local water supply.

To show the attitude of the people most interested in this proposed reserve there is attached hereto a copy of a petition submitted to the Commissioner of Public Lands by the Pupukea-Paumalu homesteaders. This petition speaks for itself.

In view of the above facts I recommend that the Governor be requested to declare and officially to set apart the area officially described below as the Pupukea Forest Reserve.

The official description of the proposed reserve prepared by the Government Survey Office is filed as C. S. F. 2137, and is shown on Registered Map No. 2252.

[The technical description is here omitted.]

Very respectfully,

RALPH S. HOSMER,
Superintendent of Forestry.

PETITION—RE FOREST RESERVE ABOVE PUPUKEA.

Maunawai, Oahu, T. H., December 10, 1909.

To the Honorable

Marston Campbell,

Commissioner of Public Lands,

Territory of Hawaii, Honolulu.

Petition:

We, the undersigned, settlers and homesteaders of Pupukea-Paumalu, respectfully ask that all that portion of the Government lands above the present homesteads, including the Waimea drainage, be set aside as a Forest Reservation for the conservation and protection of the remaining forest on said land.

If the continued destruction of the undergrowth and forest now going on, by marauding bands of cattle, is continued, this section of the Island of Oahu will eventually become barren and worthless, as it is entirely dependent upon the rainfall for cultivation.

There is not a place on this Island where the baneful results of the destruction of the forest by cattle are so manifest as are to be found in this section. The abandoned kuleanas and taro patches are mute object lessons of days gone by, when this section supported a large and prosperous Hawaiian population. In those days the table lands were covered with forest growth, and streams flowed through every gulch from the mountains to the sea, supplying life-giving water to taro patches and kuleanas, long since abandoned, where today are to be found only barren gulches and wind swept table lands.

We respectfully ask that this, the only source of our water supply, so essential to our future prosperity, and the moisture conserving forest, be given the greatest protection possible and extended whenever practicable.

For all of which we ask your protection and encouragement.

Respectfully submitted,

C. J. WHEELER,

LOUIS A. GINACA,

L. B. NEVIN,

F. S. LYMAN, Jr.,

J. P. LOONEY,

H. B. STOCKS,

O. T. BOARDMAN,

J. G. OWEN,

C. A. J. GINACA,

F. E. HALEY,

E. K. ELLSWORTH,

LESLIE C. CLARK,

E. C. WINSTON,

MRS. LUCY M. JOSEPH,

MRS. T. H. GIBSON,

HENRY G. GINACA.

BOARD OF AGRICULTURE AND FORESTRY.

A meeting of the Board of Commissioners of Agriculture and Forestry was held at the board room, in the Capitol, on Wednesday, April 27, 1910, at 2 p. m. Present: Mr. Marston Campbell, president and executive officer, Messrs. J. M. Dowsett and Albert Waterhouse, members; and R. S. Hosmer, Superintendent of Forestry, by request.

FORESTRY MATTERS.

The President read a special report submitted by the Superintendent of Forestry under date of April 26, 1910, recommending the setting apart as a small forest reserve of a portion of the government land of Hauola in the District of Hamakua, Island of Hawaii.

Mr. Campbell stated that this land, which the Hamakua Mill Company have at present under lease, is of no particular value. This area contains seven acres more or less.

The Superintendent of Forestry recommended that the Board approve the reserve and request the Governor to set apart this section to protect the Hamakua Mill Company's planting, and stated that it is deemed advisable to have a windbreak along the edge of the bluff, on the land of Opihilala, to protect the cane, or any crop growing in the lower fields. Planting this portion with a windbreak will also increase the value of the mauka area. The Hamakua Mill Company has proposed to the government that this strip of land be set apart as a forest reserve. If this is done they will plant it with a windbreak of Ironwood trees and care for the same during a period of twenty-one years, the Mill Company to have the right to any wood that may result from wood cutting, should it be deemed advisable by the forest officials of the Territory to make thinnings or improvement cuttings in the planted belt.

The Hamakua Mill Company's lease from the government terminates May 18, 1914, and these people wish to insure the continuance of the windbreak in the event of the land being subdivided at the expiration of the present lease. If this area is set apart now as a forest reserve, the planted forest can be efficiently protected, but if not there is nothing to prevent the destruction of the trees, were the land later subdivided and opened up.

Mr. Campbell said that by agreeing to set this small tract apart as a forest reserve the government has the advantage of having it planted with desirable trees, free of cost. This planting will greatly benefit the section lying next mauka and in ten years ought to be a good crop.

It was voted that the portion in question of the government land of Hauola in the District of Hamakua, Island of Oahu, be

approved as a small forest reserve and the Superintendent of Forestry was instructed to secure the necessary descriptions and have the proper documents prepared in order that the same may be submitted to the Governor of the Territory for his approval and action.

The Superintendent of Forestry said he would suggest that at the public hearing at which the proposed Hauola Reserve was considered, there also be taken up the matter of formally setting apart certain government lands within the established boundaries of the Hilo Forest Reserve. At the time the Hilo Reserve was created these lands were under lease. The law at that time only permitted the setting apart of unleased land, and since the law had been amended, action in regard to them had been postponed. The setting apart at this time is purely a formal matter, but it should be done to make the holdings strictly legal.

On motion of Mr. Dowsett it was voted that the Superintendent of Forestry be instructed to prepare a list of the lands recommended to be set apart, that his recommendation might receive approval and action by the Governor.

ENTOMOLOGY.

After some discussion in regard to the employment of an assistant to the Superintendent of Entomology it was decided to refer the matter to the Committee on Entomology with authority to act.

FINANCE.

The Secretary of the Board submitted a statement in detail of the total expenses of the Board of Agriculture and Forestry from the first of the year to date; same was accepted and ordered placed on file.

ANIMAL INDUSTRY.

In regard to the matter of the landing of livestock at Hana and Honoipu on the Island of Hawaii, which matter at the last meeting was referred to the Committee on Animal Industry, Mr. Waterhouse reported as follows:

After investigation it was found that the animals had already left San Francisco—so the next best thing was done, much to his regret, and that was to allow them to land at Honoipu. Dr. Case went up there. The committee recommended that a letter be sent to the importers of mules in that district notifying them that in the future, as specified under the law, the Board will not grant permission to land mules outside of ports mentioned in the regulations and stating that the Board is prepared to revise the present laws as soon as a quarantine station, satisfactory to the Board of Agriculture and Forestry, has been provided at such ports of

entry. If these people care to go to the expense of building a quarantine station, and then turn it over to us, it will be satisfactory, but hereafter we will not allow them to land until they have made suitable provision, as we wish no further importation under the present conditions.

It was moved that the above recommendations of the Committee on Animal Industry be accepted. There being no objections it was so ordered. Carried.

MILK ORDINANCE.

Mr. Daniel Logan of the Board of Supervisors was present and reported in regard to the testing of dairy cattle for tuberculosis. He requested that the Board of Agriculture and Forestry coöperate with the Board of Supervisors in the testing of dairy cattle within the City and County of Honolulu.

It was voted that the matter be referred to the Committee on Animal Industry with full power to act.

RARE ISLAND BIRDS.

The President read a letter dated April 12, 1910, of the Superintendent of Forestry to Professor W. A. Bryan of the College of Hawaii, stating that the twenty specimens of each rare species, which Miss Annie M. Alexander desires to collect, is too great a number; also Professor Bryan's reply to the above, of April 14, with return of list indicating the rare species, or those regarded to be extinct. In his judgment it is better to exterminate them and preserve them as specimens rather than allow them to die of their own accord.

Mr. Waterhouse said that a series of twenty birds each of the rare species seemed to him too great a number.

Mr. Dowseit stated that he was in a quandary as to what action had best be taken and moved that her application for permit be held pending till further investigation. Carried.

DIVISION OF ANIMAL INDUSTRY.

Honolulu, Hawaii, May 24, 1910.

Hon Marston Campbell, President and Executive Officer, Board of Agriculture and Forestry, Honolulu.

Sir:—I beg to report on the work of the Division of Animal Industry for the month of April, as follows:

GLANDERS.

The usual inspection in patrol work carried on by Mr. Venhuizen for the purpose of locating animals affected with glanders

has been continued during the month. On April 7 a horse suffering from acute glanders was located in an isolated stable in Moiliili and was brought to the Animal Quarantine Station by Mr. Venhuizen. The animal was destroyed the following day and a post mortem examination verified the diagnosis. The stable in which the affected animal had been kept was, with the owner's consent, burned down.

Dr. Fitzgerald on Maui, reports an outbreak of glanders at Lahaina. One animal was destroyed and a number of others were inspected and tested, and the usual precautions taken to prevent the spread of the disease.

CEREBRO SPINAL MENINGITIS.

On April 28 a wireless message was received from the Deputy Territorial Veterinarian of Kauai, reading as follows: "Come Lihue tonight steamer Hall. Strange outbreak. Urgent. (Signed) A. R. Glaisyer." At is was found impossible to respond to this call and as there was every reason to believe that no new disease could have made its appearance on Kauai, the following reply was sent: "Impossible come today. Take usual precautions prevent spread. Mail full particulars. May come Tuesday. (Signed) Norgaard." The outbreak referred to proves to be cerebro spinal meningitis among the mules of the Lihue Plantation Company. Three animals died within two days, but further spread of the disease was prevented by proper treatment and by the disinfection of the infected quarters.

Dr. Elliot of Hilo also reports an outbreak of the same disease among the plantation animals in Kau.

Correspondence pertaining to these two outbreaks is attached herewith.

IMPORTATION OF LIVE STOCK.

During the month of April the following vessels arrived with live stock intended for this Territory:

April	2—	Steamship	Sierra—1 dog, 1 crate chickens.
"	2—	"	China—4 crates chickens.
"	6—	"	Lurline—2 horses, 70 mules, 2 pigs, 2 dogs.
"	6—	"	Nevadan—5 crates chickens.
"	16—	"	Chiyo Maru—1 crate chickens.
"	19—	"	Wilhelmina—12 mules, 1 horse, 3 crates chickens.
"	22—	"	Sierra—2 dogs, 2 crates chickens.
"	22—	"	Manchuria—1 dog.
"	24—	Schooner	Muriel—16 mules.

The latter shipment was with the permission of the Board allowed to land at Honuapo, Hawaii, and the Assistant Territorial

Veterinarian went from Honolulu to that place in order to inspect them at the expiration of the quarantine period which occurred two days after his arrival. The animals were all found to be sound and were accompanied by the requisite inspection papers.

Of the 70 mules which arrived on the steamship Lurline on April 6, 32 head were allowed to remain on board the said steamer to be carried to Kahului where they were kept in quarantine under the supervision of Dr. Fitzgerald.

In connection with the shipment of a horse on the steamer Enterprise which left San Francisco on February 12 for Hilo, the said horse being accompanied by a certificate of mallein test, a letter from the Federal inspector in charge at the port of San Francisco is herewith submitted. It would appear that the inspector allowed the shipment of this horse as a result of misinformation furnished him by the shipper of the animal.

INSPECTION SERVICE ON MAUI.

I would respectfully request the Board to confirm at this meeting its decision to subsidize the Deputy Territorial Veterinarian for the District of Maui with the sum of \$50 per month from May 1, 1910, the same decision having been arrived at before the departure of Mr. Isenberg for the mainland. The Maui Live Stock Association which hitherto has been paying Dr. Fitzgerald a monthly salary of \$100 for official services has practically been dissolved. The live stock owners of the County of Maui have requested this Board to contribute to Dr. Fitzgerald's traveling expenses and subsistence while performing inspection work pertaining to the eradication of infectious and contagious diseases among live stock. It is understood that unless the Board can see its way to assist in this matter Dr. Fitzgerald's services as Deputy Territorial Veterinarian must be terminated as he cannot afford to do the official work without compensation, even though he has shown a strong inclination to do so and has to my knowledge attended to several outbreaks without receiving any compensation, therefore, not even his traveling expenses.

I believe that the members of the Board are in receipt of communications pertaining to this subject and would therefore ask the Board to take action in the matter at the present meeting. In my opinion it would be very unfortunate if the office of Deputy Territorial Veterinarian for Maui would have to be abolished, as glanders undoubtedly prevails on this island to a greater extent than on any of the other islands.

TUBERCULOSIS.

Considerable time has been given to the investigation of the prevalence of tuberculosis among the dairy cattle of the City and County of Honolulu. In order to enforce the milk ordinance passed by the Board of Supervisors it became necessary for them

to request the coöperation of this Board, and the same was agreed to at the last meeting of this Board on the condition that the necessary expenditures connected with this work should be borne by the Board of Supervisors. This work is now in progress and a full report on the same will be made as soon as definite conclusions and sufficient observations have been made on which to base recommendations for the improvement of the milk supply of the City and County of Honolulu.

Very respectfully,

V. A. NORGAARD,
Territorial Veterinarian.

DIVISION OF FORESTRY.

May 24, 1910.

The Board of Commissioners of Agriculture and Forestry,
Honolulu, Hawaii.

Gentlemen:—I have the honor to submit a report covering the work of the Division of Forestry for the months of April and May, 1910.

EUCALYPTUS INVESTIGATION.

Having completed the field work incident to the investigation of the groves of planted Eucalyptus on Hawaii, Maui, Oahu and Kauai, Mr. Louis Margolin returned to Honolulu early in April to work up the data and prepare his report. This he completed just prior to his departure for California on May 8, where he returns to take up his regular work in the Forest Service. Before the report can be made public it must receive the formal approval of the Secretary of Agriculture. Immediately upon the return of the manuscript from Washington I recommend that the report be published as a bulletin of the Division of Forestry. The report brings together all the local information now available, about the genus Eucalyptus and contains definite recommendations that together cannot but be of great value to tree planters in Hawaii.

FOREST PLANTING IN PROGRESS.

Under the contract made in March with Mr. C. G. Owen, tree planting has been actively going on on Water Reserve C, of the Pupukeya Homestead Tract. The trees have been shipped from the Government Nursery at Honolulu at the rate of 2,000 per week.

Through an arrangement with the Federal Forest Reserve a tract in Nuuanu Valley has been laid out for the experimental planting of Eucalypts, the cost to be borne from Federal funds. The actual planting of trees will commence in June, the ground is now being made ready.

Forest planting under the auspices of this Division is also about to be started on a portion of the Makawao Forest Reserve, Maui. The Maui Agricultural Company has agreed to replant an open area above Kailiili in return for the right to remove dead trees now standing on the land which can be used for fuel. Preliminary arrangements have been completed and detailed plans are now in preparation. This planting also will consist mainly of Eucalypts. A number of different kinds will be planted in blocks of several acres each so that as the groves grow they will be no small value for purposes of comparison.

Trees for forest planting by corporations and individuals are constantly being sent out from the Government Nursery. Mr. Haughs' report for April enumerates some of the more important shipments made during that month.

PLANTING PLANS.

The making of planting plans for individuals and corporations and the giving of advice in regard to tree planting is one of the important lines of work of the Division of Forestry. In response to a request from the Molokai Ranch Company, (Mr. Geo. P. Cooke, Manager), I have recently spent some time on the Island of Molokai, going over the ground that the ranch desires to plant, and discussing with Mr. Cooke the ways and means of doing the work required. A planting plan is now being drawn up for the ranch, which will outline in detail the recommendations made.

FOREST RESERVE.

Following a public hearing by the Governor and the Board on April 30, in regard to the creation of a forest reserve above the Pupukea-Paumalu Homestead Tract on Oahu, the Governor on May 10 signed a proclamation creating the Pupukea Forest Reserve, an area altogether of 865 acres.

A public hearing has been called for June 13, to consider the setting apart of a small reserve in Hamakua, Hawaii; a portion of the sea bluff on the land of Hauola. Reports and documents in regard to this project were submitted to and acted on by the Board during May.

During my recent visit to Molokai I was able to examine, on the ground in detail, the boundary of the proposed Molokai Forest Reserve. I expect to submit a report on this project with recommendations, to the Board in the near future.

FOREST FENCE AT PUPUKEA.

Early in May a contract was let to fence the boundaries of the Pupukea Forest Reserve on Oahu. This work is now in progress.

BOTANICAL INVESTIGATION.

Mr. J. F. Rock, the Botanist of the Division of Forestry, spent the greater part of April on the Island of Molokai. He brought back much interesting material from the mountain forests, some rare Hawaiian plants being found only on that Island. At present Mr. Rock is on Hawaii, collecting on the slopes of Mauna Kea and on the Kohala Mountain.

Very respectfully,

RALPH S. HOSMER,
Superintendent of Forestry.

Honolulu, Hawaii, April 30, 1910.

R. S. Hosmer, Esq., Superintendent of Forestry, Honolulu, Hawaii.

Dear Sir:—The following report gives the principal work done during the month of April.

NURSERY.

Mr. Gerrit P. Wilder is sending large quantities of seeds and plants from the different countries which he is visiting. We have already received consignments from Manila, Calcutta, Singapore and Ceylon. Two wardian cases and one box of plants were received from Mr. Wilder from Singapore. The plants are being taken care of and the seed propagated in our propagating houses.

Other work done at the nursery has been packing up and shipping plants, transplanting seedlings, etc.

Plants distributed during the month:

	In Seed Boxes.	Transplanted in Boxes.	Pot- grown.
Sold	16,000	450	1,464
Gratis	9,300	5,038	4,421
	<hr/> 25,300	<hr/> 5,488	<hr/> 5,885.

Total, 36,675.

Eight thousand of the above plants were sent to Mr. C. G. Owen to be planted on Reserve "C," Pupukea-Pamaulu Homesteads, as follows:

- 4,000 *Eucalyptus robusta* transplanted in boxes;
- 3,063 of same species pot grown;
- 637 *Cryptomeria japonica*;
- 111 *Cupressus macrocarpa* transplanted in boxes;
- 189 pot grown.

Ten thousand ironwood plants (*Casuarina equisetifolia*) in seed boxes were sent to Makaweli plantation, Kauai. Owing to careless handling by the steamship people five boxes of the seedlings, approximately 5,000 plants, were practically destroyed. Manager Baldwin stated in his letter that five of the boxes were very much damaged owing to the soil being loosened and the trees mixed up every which way. The loss will be made good by us without cost to the plantation. Five more boxes will be shipped next week.

SEED COLLECTING.

The two seed boys have been collecting seed in the city. The seed collected being practically *Casuarina equisetifolia*, *C. quadrivalis*, also the different *Cassias*. The seeding season for the *Grevillea robusta* will be on soon and will take up much of the time of the collectors as it is rather difficult to gather.

EXPERIMENT GARDEN, MAKIKI.

The everblooming Bougainvillea vines ordered by Mr. Marston Campbell have been planted on the two knolls at the lower end of Heron Valley, close by the line of the new Tantalus road. The number of vines planted being 410. A large number of cuttings of the different shades of the Bougainvillea have been planted at the nursery and Makiki garden, these will be ready in about four months. We are indebted to Mr. Ralph G. E. Forster, British Consul, for cuttings of the red variety, to Mr. John Cummings, Ahipuu, for cuttings of the light brick variety, and to Mrs. Chas. McCarthy and others for cuttings of the everblooming purple.

We have received from Mr. J. E. Higgins of the U. S. Experiment Station seven varieties of the Rattan palm (*Daemonorops*) which will be planted at the Makiki garden.

NUUANU STATION.

The man at the Station has been doing the regular routine work clearing away vines from the trees, etc.

Respectfully submitted,

DAVID HAUGHS,
Forest Nurseryman.

DIVISION OF ENTOMOLOGY.

Honolulu, Hawaii, May 1, 1910.

Honorable Board of Commissioners of Agriculture and Forestry,
Honolulu.

Gentlemen:—I respectfully submit my report of the work of the Division of Entomology for the month of April.

Of 33 vessels boarded we found fruit, plants and vegetables on 21. The usual care was taken in the rigid inspection with the following results:

<i>Disposal with Principal causes.</i>	<i>Lots.</i>	<i>Parcels.</i>
Passed as free from pests.....	700	15,345
Fumigated before releasing.....	23	29
Burned	37	37
Dipped in formaldehyde.....	1	1
Returned	1	1
Total	762	15,413

PESTS INTERCEPTED.

On a shipment of plants from Fiji we found a plant infested with mealy bug *Pseudococcus citri*. In bamboo stems from the Orient and in packing material from same locality two species of ants were found. In seeds from East Indies we found some larvae of a weevil. We also found tree seeds from the States infested with weevils. A box of limes from Acapulco, Mexico, came with the usual fruit shipments per "Sierra." These were shipped by a San Francisco dealer and as they were infested with two species of scale insects and are on the prohibited list of fruits for the Territory we ordered them returned to shipper. A pomelo tree from Amoy, China, arrived without the usual U. S. quarantine certificate and would have been destroyed under the ruling of that Department; however, as most of the material used in shipping was furnished by the U. S. Experiment Station here, the whole matter was left to the Division of Entomology with the request to thoroughly disinfect the package. This has been done and all soil and packing material destroyed and only the plant, which fortunately was free from pests, was turned over to the Experiment Station. As the fruit is known to be of very fine quality and much time and trouble had been taken to procure the tree we are glad that we were able to assist in the introduction of it.

As stated in my last report I was unable to submit Brother Matthias Newell's monthly report and I now append it for March and April.

In March six vessels were boarded on which were found 94 lots, consisting of 1,523 parcels. In April ten vessels were boarded on which were found 87 lots, consisting of 1,465 parcels. One parcel of palm seeds contained beetle larvae and all infested seeds were burned.

One colony of cabbage worm parasites was liberated during the month. Owing to the small area of cabbages now growing, as well as to the reduction of the pest by fungi and other agencies, we have had to stop breeding the new parasite for the present, as it is difficult to procure sufficient hosts for the work.

Very truly yours,

EDW. M. EHRHORN,
Superintendent of Entomology.

DEPARTMENT OF PUBLIC LANDS.

Marston Campbell, Commissioner of Public Lands, notifies the Secretary of Hawaii, E. A. Mott-Smith, of the following disposition of public lands for the month of March, 1910:

General Lease—Date of sale, Nov. 13, 1909; purchaser, Chas. H. Swain; location, Kamaili-Kehene, Puna, Hawaii; area, 1520 acres; term, 15 years; annual rental, \$78.00.

Cash Freehold—Date of agreement, March 7, 1910; freeholder, Charles Akau; lot No. 44; location, Olaa, Puna, Hawaii; area, 10.27 acres; purchase price, \$25.65; No. of agreement, 93.

Special Agreements—J. Coonradt, purchaser, lot No. 3A, Pupukea-Paumalu, Koolauloa, Oahu; 85 acres; price, \$1,175.

Mrs. Mary Carmen Gilbert, lot 16, Lualualei makai, Waianae, Oahu; 42.40 acres, \$4,260.

James Stewart, lot 5, Keaau, Waianae, Oahu, 47.50 acres, \$250.

A. V. Gear, lot 6, Keaau, Waianae, Oahu, 17 acres, \$505.

E. J. Abrahamson, lot 7, Keaau, Waianae, Oahu, 58.45 acres, \$650.

Mrs. Susa M. Peterson, lot 8, Keaau, Waianae, Oahu, 46.20 acres, \$2,050.

H. A. Juen, lot 9, Keaau, Waianae, Oahu, 46 acres, \$600.

L. Kaina, lot 2, Kaohe, Puna, Hawaii, 92.60 acres, \$329.

A. R. Philip, lot 7, Kaohe, Puna, Hawaii, 60.95 acres, \$250.

I. C. Kamakaiwi, lot 12, Kaohe, Puna, Hawaii, 98.83 acres, \$335.

I. N. Kamakaiwi, lot 13, Kaohe, Puna, Hawaii, 89.40 acres, \$318.

L. Gardner, lot 14, Kaohe, Puna, Hawaii, 73.40 acres, \$256.

A. Makahio, lot 15, Kaohe, Puna, Hawaii, 71.60 acres, \$287.

Kamakani, lot 16, Kaohe, Puna, Hawaii, 75.40 acres, \$303.

A. Tefanowski, lot 13, Olaa New Tract, Puna, Hawaii, 48.62 acres, \$195.

Mrs. L. Swain, lot 6, Kaimu mauka, Puna, Hawaii, 87.20 acres, \$437.

S. K. Kau, lot 20/32, Kaimu, Puna, Hawaii, 13.80 acres, \$30.

N. Aio, lot 21, Kaimu, Puna, Hawaii, 6.80 acres, \$18.

Mrs. K. Kaiaama, lot 22, Kamaili, Puna, Hawaii, 32.30 acres, \$130.

W. Kelihoomalua, lot 13, Kamaili, Puna, Hawaii, 95.35 acres, \$271.

Mrs. M. Kama, lot 24, Kikala, Puna, Hawaii, 11.40 acres, \$23.

J. G. Lincoln, lot 41, Kaauhuhu, Kohala, Hawaii, 32.26 acres, \$407.

Cash Sales.—H. J. Lyman, purchaser, lot 16, Kamaili, Puna, Hawaii, 28.50 acres, \$114.

M. Ramos, lots 46, 47, 48, Kaapahu, Hamakua, Hawaii, 60 acres, \$915.

J. W. Leonhart, lot 27, Pohakea, Hamakua, Hawaii, 54.92 acres, \$1,570.

Cabola, lot 44, Pohakea, Hamakua, Hawaii, 67.80 acres, \$910.

A Lidgate, lot 17A, Pohakea, Hamakua, Hawaii, 59.40 acres, \$1,030.

W. K. Notley, lot 17B, Pohakea, Hamakua, Hawaii, 52.70 acres, \$1,750.

Eliza Y. Atkins, lot 38, Kaauhuhu, Kohala, Hawaii, 35.85 acres, \$270.

R. H. Atkins, lot 39, Kaauhuhu, Kohala, Hawaii, 28.85 acres, \$455.

John K. Notley, lot 17, Lualualei makai, Waianae, Oahu, 52.96 acres, \$655.

Commissioner Campbell reports the following dispositions of public lands for the month of April:

General Lease.—Manuel Gomes, purchaser; location, Hiana-loli, N. Kona, Hawaii; area, 200.39 acres; term, 15 years; annual rental, \$51.

Cash Sales.—Wahiawa Land Co., Ltd., purchased the following lots, all in Kaukonahua Gulch, Waialua, Oahu: No. 1, area 43 acres, price \$108.50; 2, 28.60 acres, \$72.50; 3, 15 acres, \$38.50; 4, 19.50 acres, \$49.75; 5, 6.20 acres, \$16.50; 6, 5 acres, \$13.50; 7, 4 acres, \$11; 9, 15.30 acres, \$39.25; 10, 4.80 acres, \$13; 11, 14 acres, \$36; 12, 11.40 acres, \$29.50; 13, 50 acres, \$170; 14, 25.70 acres, \$65.25; 15, 41 acres, \$247.88; 16, 21.50 acres, \$588.25; 17, 29 acres, \$373.25.

Halemano Land Co., Ltd., lot 8, Kaukonahua Gulch, Waialua, Oahu, 30 acres, \$76.

Kemoo Land Co., Ltd., lot 18, Kaukonahua Gulch, Waialua, Oahu, 1.80 acres, \$3,821.

A. W. Carter, guardian, Waimea, South Kohala, Hawaii—Lot A, 2.04 acres, \$205; B, 2.53 acres, \$254; C, 4.75 acres, \$357; D, 7 acres, \$351; E, 33.75 acres, \$1,688.50.

Cash Sales on Time Payment.—F. K. Howard, lots 594 and 598 inclusive, Makiki Heights, Kona, Oahu, area 3.65 acres, \$4,901.

H. T. Bowen, lot 625, Makiki Heights, Kona, Oahu, 0.98 acre, \$351.

Mrs. E. C. Bowen, lot 626, Makiki Heights, Kona, Oahu, 0.92 acre, \$690.

Mrs. Gregory, lot 628, Makiki Heights, Kona, Oahu, 0.90 acre, \$575.

Mrs. B. March, lot 629, Makiki Heights, Kona, Oahu, 0.92 acre, \$601.

F. L. Hadley, lot 630, Makiki Heights, Kona, Oahu, 10.3 acres, \$651.

REPORT ON RICE AND COTTON INVESTIGATIONS IN CHINA AND JAPAN.

BY F. G. KRAUSS,

Agronomist, Hawaii Agricultural Experiment Station, Honolulu, Hawaii.

In the fall of 1909 the writer was authorized to undertake investigations in rice and cotton culture in China and Japan.

Arriving at Yokohama, August 22nd, I proceeded at once to Hongkong, via Kobe, overland. The distance from Tokyo to Kobe is about 375 miles by rail. Some idea of the extent of Japan's fertile rice areas was obtained on this preliminary trip through the heart of this Garden Kingdom. Mile after mile of continuous paddy fields dominated both sides of the railroad and extended from mountain to sea like an immense checker-board.

The crops throughout this region were either just coming into flower or approaching maturity, becoming more advanced as one proceeded south. With the exception of occasional flooded areas in the Osaka plain region, the crops were on the whole very promising, the season having been exceptionally favorable. The trip up the Canton or Pearl River from Hongkong to Canton becomes more and more interesting as one approaches the latter city. Emerging from the picturesque hill country the river winds its way through great stretches of low lands, whose fertile deltas provide some of the most productive rice fields to be found anywhere. Here the river and numerous canals are bordered by low earth levies upon whose crest have been planted miles of the famous litchi nut.

This region, which includes Kwangtung and Kwongsi provinces (from whence most of the Chinese in Hawaii come), is an important agricultural area. With ideal climate, soil and water resources, together with a dense and unusually industrious population, no other part of the world supports a greater number of souls from its soil as does this part of southern China.

Lying in the same degree of latitude as Hawaii, most of the crops grown here are to be found there. Among these the most important is rice, which is the great staple of the region. The quality of this product is considered the best grown in China, but the production does not fully supply the needs of the population, in consequence of which its exportation is prohibited by the government. Soy beans and other members of the pulse family are extensively grown. These form an important article of diet, the Chinese evidently appreciating the value of nitrogenous food in connection with the more starchy cereal rice; millets, sweet potatoes, taro, peanuts, tea, sesame seed, Indian corn, tobacco, mulberries (with silk products), matting sedges, ramie and cotton. Many kinds of tropical and semi-tropical fruits also thrive there. Sugar cane is grown to a slight extent, and does well in many localities. With modern cultural methods and greater enterprise this crop could doubtless be developed into an important industry. Poultry and swine are the principal live stock. A small neat milch cow is occasionally met with, but beef cattle and horses are rare. Such agricultural work, as is not performed by hand labor, is usually done with the aid of water-buffalo, as is still common in the paddy fields in some parts of Hawaii.

Having letters to Professor Y. H. Tong, the noted rice expert and director of the recently established Canton Provincial Experiment Station and College of Agriculture, I called at that institution, but found that he was absent in Peking, where the Chinese Government is about to establish a similar institution. I met, however, Dr. Y. Li, the chemist, who is a graduate of an English university, and was shown about the Station by him. The Station, although established only a year, has made a good beginning, and I was well repaid by several visits. Comparatively little has been done as yet on rice, but the cotton plats were at their best. Some ten varieties, consisting of American Upland and native cottons, are being grown according to American methods. While well cared for, the plants of none of the varieties compared with those of our growing. Not only were they undersized, but the quality of the fibre and the yields were very poor. I examined all the varieties critically many times and should feel very much discouraged if our experiments gave no better results than those obtained there. That the season was fairly normal was indicated by the thrifty growth of other crops, such as sugar cane, mulberries and vegetables. After studying the cotton conditions at Shanghai and throughout central and

southern Japan, I have come to the conclusion that the unfavorable conditions are almost wholly climatic, and in this the Station people generally agree. While disappointing from the standpoint of the investigator seeking better cultural methods, it revealed marketing possibilities for the Hawaiian product.

It is interesting to note that everywhere, except at the Experiment Stations, the cotton is sown thickly broadcast in long narrow beds, the plants standing less than a foot apart in each direction. In consequence of this crowding the main stems rarely branch and grow no higher than eighteen to twenty-four inches. The average number of bolls per plant is about five, and these are very small, at least 150 bolls being required to make a pound. I saw no insect pests affecting the cotton, but noticed a blemish on the foliage, which may be the yellow leaf-blight of the South. Anthracnose of the bolls was also observed, accompanied with shedding of the immature bolls, which, however, may be caused independently of the disease mentioned, as it doubtlessly is in Hawaii. I found rotting of the interior of freshly bursted bolls quite common; the cause is probably excessive dews or showery weather at time of ripening.

Much silk, but very little cotton, is produced in the southern provinces, and I devoted my time principally to varieties of rice and methods of rice culture. At the time of my visit the growth of the crop was only about two-thirds complete, and no mature stocks were available. In the Canton markets, however, I found a half dozen distinct kinds of rice.

The following data were procured from various reliable sources, and were only obtained by careful personal inquiry and frequent verification.

The finest variety of rice grown in China is unquestionably the "See Miu" from Tsang Shing district, some seventy miles east of Canton. I intended to visit this region, but finding it much farther and more difficult to reach than I had expected, I gave up the trip as not worth while at a season when no selections of grains could be made. The exportation of this rice is strictly prohibited, but arrangements were made by which a small sample of selected seed was forwarded to this Station upon the completion of the harvest.

In Hongkong, which is an important jobbing center, I later found that some twenty varieties of rice were distinguished by the trade. From among these I have selected ten varieties as having possible value in Hawaii. These are enumerated in the list below. The Chinese characters are added as confusion often results from romanizing Chinese names, which, as usually applied, may mean any one of a dozen different things.

1. See Miu (苗絲城增). A fall variety considered the best grown in China. Used especially as a curry rice by foreigners and by wealthy Chinese. Its culture is restricted to the

Tsang Shing district, which is near Canton. Its exportation is prohibited by the Government, but a small quantity is said to be smuggled into Hongkong where it brings an exceptional price.

No. 2. Ma Paw Kam Kuk (谷錦包麻), signifying "dragon's teeth," is another standard variety much in demand by those who can afford it. This is also a fall variety, as the best varieties generally are said to be.

No. 3. Chiin Chai Kuk (粘仔谷), is a small grained rice of excellent quality. It is also a fall variety.

No. 4. Ma Paw Kam (麻包錦), and No. 5, (Tso) No Kuk (早糯谷), are comparatively soft grained rices, for which reason they are called "old man's" rice. The latter is one of the earliest varieties grown. Both varieties are spring rices and for this reason would probably be suitable as "all season" varieties in Hawaii, to judge from experience with other spring croppers grown by us.

No. 6. Soong Nga Chim Kuk (龍牙粘谷) is not much grown because of its poor yields, but the quality is said to be very fine. It is classed as a spring variety.

No. 7. Pun Tin Wan Kuk (半天雲谷) is characterized by flakiness after cooking, for which quality it is highly prized by some. It is a fall variety.

No. 8. Shang Shing Chim Kuk (省城粘谷) is called the Cantonese rice. It is the most generally grown rice in the south. It is of excellent quality for a spring variety.

No. 9. the variety most generally grown in the fall, is one originally obtained from Hawaii, called San Chung Kuk (新種谷), the Chinese name signifying "new seed." I was unable to get paddy samples of this variety and cannot, therefore, say whether or not it is one of our present standard rices.

No. 10. Ham Man Kuk (咸問谷), is a fall variety said to be especially suited to brackish water, and is possibly the same variety grown under brackish water conditions in Hawaii.

Mr. Stuart Fuller, Acting Consul General at Hongkong, who has had considerable correspondence with the Agricultural Department at Washington, informed me that a rice known by the local merchants as Sun Tsim (萱粘), the name signifying "long kernel," coming from Annam, Indo China, where it is known as "Suanese garden rice," is said to be a very fine rice. A small quantity of the seed was recently, upon urgent request, sent to the Department at Washington.

Since my return to Hawaii, a generous sample of "Chow Heung" (背底水秋香) rice has been received from the Consul General at Canton. This is one of the best spring varieties and is extensively grown in the Hum Hoi District. Mr.



AGRICULTURAL AREA IN SOUTHERN CHINA.

Cyperus matting plant, sugar cane, taro and ramie surrounded by a large tract of rice.



PREPARING PADDY FIELDS TO RECEIVE SUCCEEDING CROP.

Practically all of Japan's 15 millions of acres of rice lands are tilled by hand.

McClintock, for many years a missionary on the Island of Hainan, (China), has kindly sent me samples of the two best varieties grown in that region. These are: Ciam Tsai (粘子) and Ai Miao (矮苗).

This list seems to include the best rices grown in China. For the data, I am indebted to a number of persons, among whom should be mentioned Mr. S. T. Dunn, Botanist in charge of the Botanical Gardens at Hongkong, who has made exhaustive studies of the rices of southern China; to Mr. Wo Fung Shop at Hongkong; and to Mr. T. Tong, in charge of the party of Chinese students recently sent to America by the Chinese Government, who as a fellow-passenger on my homeward journey, kindly went over my notes, correcting the Chinese names where necessary.

The cultural methods of rice production are similar to those followed in Hawaii. Two crops per annum are grown, except on the river deltas, where the spring floods frequently carry away the first crop. Seed is sown in nursery-beds, for the spring crop from March 1st to 20th, and for the second or fall crop, from June 1st to 10th. The seedlings are transplanted from April 20th to May 5th for the first crop, and for the second, from July 23rd to August 7th. The average age of the seedlings for spring plantings is about thirty days and for fall planting about forty days, at which ages the seedlings will average twelve to eighteen inches in height. Three to six seedlings are set in a clump, the clumps being spaced nine inches apart, in rows nine inches apart. The fields are flooded immediately after planting, to a depth of two to three inches in the spring, an inch less in the fall (except where irrigation is less under control, when the plants may be completely submerged, or the fields parched for want of water). The average time from planting to harvest, for the spring crop, is 115 days, and for the fall crop about 125 days. The longer period of growth in the fall crop is due to varietal differences and not to season.

Considering that many rice fields have been under cultivation for probably thousands of years, I became especially interested in the methods used to maintain and improve the fertility of the soil. A summarizing of the average yields of paddy gave the following results, which I believe to be reliable: Best yields, 4000 to 4500 pounds, medium yields 2000 to 2500 pounds, poorest yields 1000 to 1500 pounds of paddy per acre. From this it will be seen that these soils are not lacking in productivity. These yields at least equal, if they do not exceed, those secured in Hawaii, and on lands in many cases originally less fertile than ours. To discover how such results have been obtained continuously from remote periods to the present was to be a fascinating study. There seemed to be something magical about it. But, after all, the matter is very simple,—so simple that we in Hawaii have

overlooked it. In the first place, many of the paddy fields are "made soils," that is, soils which are too "heavy" are mixed with sandy soils. Clay and loam soils are mixed with those of a sandy nature. The materials are often conveyed long distances. During the winter the soil, after being mixed with vegetable refuse, is thrown up in heaps and composted. In the spring the mass is again distributed and the crop planted. In the meantime every particle of animal and vegetable refuse is collected into reservoirs, simple excavations in the fields near canals, which facilitate the disposal of night soils, probably the most important manurial substance used. These night soils are daily collected from the cities and towns,—in the aggregate, enormous quantities being secured. Furthermore, the rivers and canals are continually being dredged for the fertile ooze covering the bottoms. All this is stored in the reservoirs, which are frequently plastered to prevent loss by seepage, and are covered with a thatched roof to keep out the sun and rain. Nothing is wasted or permitted to deteriorate through neglect. Large stone-ware vessels are conveniently placed along the roadways for the use of the passing traveler. Street sweepings, hair from the barber shops, offal from the butcher shops, feathers, bones, leaves, straw, animal droppings, soot and even the bath and wash water are conserved,—nothing is too insignificant. The dung of domestic animals is esteemed the most valuable of fertilizers and is a regular and important article of commerce. While they have no chemists to place a valuation on these commodities, they appear to know their worth instinctively. Or, as the writer several times noticed, a stick would be plunged into the mass and passed under the nose; evidently this was the crucial test of their fertilizing value. A Chinese "fertilizer factory" is a unique institution. They are plentiful about Canton and I visited several of them. On a permanent, smooth, well firmed earthen floor a quantity of the thickest material from the reservoirs is spread and to this semi-liquid mass, earth is added in varying quantities, when the whole is thoroughly worked together. More earth or more of the remaining liquid portions of manure may be added, if in the judgment of the manufacturers, the "grade" or "standard" of the product calls for such fortification. When of the consistency of mortar, the mass is spread out in a thin layer on the floor, which is previously sprinkled with rice-hull ash to prevent sticking. In a day or two the mass has become sufficiently sun-dried to be taken up in slabs, which are broken up and stacked in piles for storage and ripening; there may be several tons in a pile. These are then thatched with straw for protection against the weather. Shortly it is ready for sale or home use. The cash value per ton is \$4.00 to \$6.00. This fertilizer is used exclusively as a top dressing on rice and vegetables. For the former crop it is first pulverized and applied at the rate of about 200 cadic (266 pounds) per mau (6600 square feet), or,



TRANSPLANTING RICE SEEDLINGS.
Women do a large part of this field work in Japan.



HEADING RICE BY STRIPPING.
After the crop is harvested the sheafs are brought to the farm stead and the grain removed by the women and children of the household.

say three-fourths of a ton per acre. The plants are about a month old and a foot high when the first application is made; the second application is made a short time before the flowering period. The effects of the fertilizer are said to be noticeable within a few days, and the ultimate results are very satisfactory, the yield frequently being double that of unfertilized fields. A sample of this material was secured and has been submitted to the Station chemist for analysis.

The half-liquid night soils, which are collected daily from more than two millions of persons in the environment of Canton, are stored in cisterns and allowed to putrify for a month or two. They are then diluted, and are applied as are the composts already described. The effects of these manures seem to indicate that their fertilizing constituents are quite as available as are our most soluble chemical fertilizers.

The value of wood ashes and lime is well understood and they are used as far as possible, but the supply seems limited. It is said that the plastered walls of old buildings are frequently renewed for the purpose of securing the debris for fertilizing purposes. On the sea coast fish and seaweeds form valuable fertilizing material. In some sections they are used exclusively.

Notwithstanding all this careful husbanding of manurial material, the supply would still be insufficient to meet the needs were it not for the practically unlimited canal and river muck which perpetually accumulates wherever large river populations exist. On the Canton and Yangtse-kiang Rivers, and their tributaries, and on innumerable canals, an extensive business has been developed of dredging the muck for sale, numerous specially equipped craft being employed. Additional fertility is secured by rational systems of crop rotations, and extensive practices of green manuring, even the herbage of the hills and weeds along the roadside are made to contribute their part.

Little need be said of the industry and skill of the Chinese farmer. His practice in tillage, irrigation, drainage, and manuring is unique and well nigh perfect, though he may not always know the reasons for his results. The secret of his success is to be found in small holdings, long experience, thoroughness and patience to a degree rarely seen, even among the most successful orientals in Hawaii, where the spirit of large holdings and immediate returns takes possession of all who come within its influence.

During my stay at Canton I made special efforts to look into the matting industry. While considerable *Cyperus* is grown along the river, beyond Canton, it is in small and scattered patches. At the time of my visit most of the crop had been harvested and the cured product was being shipped to the city for manufacture into mats. The mat-making is all done by hand in small shops or in the farm houses by the farmer and his family. Labor costs ten to fifteen cents per day. This cheap labor in the

Orient, combined with the rapidity and neatness of the oriental workmen, makes quite clear why it is impossible for American weaving establishments to compete with the oriental product, and consequently why they cannot now purchase our raw product at any price. So far as I am able to judge, our yields of *Cyperus* are equal to any I saw in China, both in length of stem and acre yields. The prevailing idea that the *Cyperus* grows principally in brackish water was not confirmed by anything I saw. It flourishes along the river, beyond tide-water, where it is rarely replanted. When cultivated, it is planted in rotation with rice, and is replanted every year. The same fungus disease of the stem which affects our plants, is prevalent in both China and Japan. In the former country some effort has been made to lessen the injury caused by the disease, by planting on new ground and selecting healthy plants. In Japan the disease has been thoroughly studied. The fungus is one of the *Peronosporae*, and has been described by Drs. Kaurikamis and Miyabe as a new genus under the name of "*Kawakamia*." No means has as yet been discovered to control it, although treating with Bordeaux mixture has been found helpful in Japan as well as here.

At Hongkong my attention was called to a plant similar to *Cyperus* in its uses, and said to be superior for the manufacture of mattings, but I have not yet been able to determine its botanical name. It is called Shire Hing straw. Seeds or plants have been applied for to the Hongkong Botanical Gardens. My attention was also called to numerous other economic plants which might be grown in Hawaii. Among these are various wax and varnish-producing trees, whose products form important commodities. The U. S. Department of Agriculture has now under way an investigation of the Chinese "varnish" tree.

While at Canton, our Consul-General accorded me the privileges of the Canton Club library, which is unusually rich in literature concerning China. The following reference works on Chinese agriculture were consulted, and are recommended to those interested as the most reliable authorities for central and southern China: The "*Chinese Repository*" in twenty volumes, published during 1840-1850. Among the most valuable information obtained was that from translations of the "*Nung Ching Ysuen Shu*," (農政全書) or Encyclopedia of Agriculture, the most comprehensive treatise on agriculture possessed by the Chinese. This work is divided into sixty chapters, each treating a particular subject. Although written during the Ming Dynasty (1368-1628), an article on the culture of cotton (chapters XXV), a translation of which appears in Vol. XVIII of the "*Chinese Repository*," would compare favorably with any modern work familiar to me. Of this I made an abstract for personal reference, but is too extensive to be included here. The



CLEAN RICE BAGGED READY FOR SALE.

The rice containers are woven from rice straw and are neat and strong.



HULLING AND GRADING RICE.

After thrashing, the grain is hulled and graded. The milling machinery while antiquated is effective.

Pien Miu Tu-tswan (便民圖蔘) or "Popular Manual of Agriculture," is another valuable reference work. Dr. S. T. Dunn, Director of the Botanical Gardens at Hongkong, recommended "Chi Wu Ming, Wu Ke Jum" as the best botanical work; it is in three large volumes. The Reports of the Botanical and Forestry Department of Hongkong also contain valuable data on Chinese agriculture.

I left Hongkong on September 9th for Tokyo and spent part of the 11th and 12th in the vicinity of Shanghai. Considerable cotton is grown there and the crop was just maturing. Harvesting had already begun. There, as elsewhere in China, the seed is sown broadcast in long, narrow beds. The plants are allowed to stand from six inches to a foot apart, and because of crowding, rarely branch. The slender, single stems seldom bear more than six bolls; the bolls are small and the quality of the lint inferior, the length averaging about one-half inch. The yield of the cotton I saw in several localities could not exceed one hundred pounds of lint per acre, more often not more than that amount of seed cotton is obtained. But land and labor are cheap, so that a small profit remains for the grower even with these small yields. Inquiry as to the adaptability of American methods of cultivation in China invariably brought the reply that the methods they employed were best adapted to their conditions, although in the Chinese agricultural encyclopedia, referred to above, the methods we practice are strongly recommended. It was very apparent that no superior varieties could be obtained in that locality and there was nothing new to be learned as to cultural methods. Because of the recent floods on the Yangtse-kiang, and the poor showing made at Shanghai, it was considered not worth while to proceed to Hankow.

In reaching Japan, I visited Kobe and Osaka and presented letters from the Japanese Consul-General in Honolulu, to the Mitsui Bussan Kaisha, a large importing and exporting house. The Kobe house handles a large part of the rice export trade, the trade with Hawaii forming an important item in their business. I obtained from them the information that practically all of the rice exported to Hawaii comes from Yamaguchi province, where I later visited. The Osaka branch handles largely cotton products. Mr. K. Kanabata, the manager, looked over samples of our Chinese Upland and Triumph cotton, pronounced them exceptionally fine, and considered them of a higher grade than any they had yet seen. The following prices were quoted on cotton delivered at either Yokohama or Kobe:

Chinese Upland, as per sample, 38 yen per picul, or about 14 cents per pound.

Triumph, as per sample, 42 yen per picul, or about 16 cents per pound.

Their imported Texas Upland cotton with a staple seven-eighths to one inch long, approaches nearest to our cotton, and

for it they pay thirty-two to forty yen per picul, or twelve to fifteen cents per pound. The cost of transportation from Texas to Yokohama is \$1.35 gold per one hundred pounds.

I was told that their cotton imports amounted to approximately 50,000 tons annually. Most of this comes from India—a cheap inferior article. The balance comes from China and the United States, the cotton from the latter country being much superior to any of the others. A small quantity of Egyptian cotton is imported, but comparatively little long staple cotton is used. Samples of Hawaiian cottons will be gladly received and offers will be quoted. It was easy to see that the possibility of obtaining cotton from Hawaii interests the Japanese importers, especially since it has been definitely settled that cotton cannot be grown economically in Japan. Ten years ago, it is reported, there were 50,000 acres or more devoted to the cultivation of cotton. At the present time there are hardly more than 1000 acres, and this cotton is largely for private use by the peasantry.

On my arrival at the Central Experiment Station at Nishigahara, near Tokyo, Director Kozai had a very complete plan outlined to aid me in visiting the principal rice-growing regions, and especially the Kinai Branch Station at Kashihara, near Osaka, where the work is entirely given over to rice breeding; the Kinshin Branch Station at Kumamoto, where the diseases and insect pests of rice are studied, and the Prefecture Demonstration Stations at Fukuoka, Yamaguchi and Akashi.

Before starting on this trip I spent four days at the Central Station in order to familiarize myself with their work and methods. This institution, established in 1890, and the outgrowth of Japan's first attempts some forty years ago to improve agriculture by scientific methods, supervises the Experiment Station work of the entire Empire. Its various departments are well organized. The staff consists of about thirty specialists and numerous assistants, numbers of whom received their technical training abroad. While its buildings are unpretentious, the equipment is excellent and the men and their work impress one as exceptionally good.

(To be Continued.)

THE MEANING OF CONSERVATION.

A paper read before the Public Question Club on February 18, and before the Social Science Association, Honolulu, on May 2, 1910.

BY RALPH S. HOSMER,

Chairman, Territorial Conservation Commission of Hawaii.

Within the last three years a new term, Conservation, has found a place in the American vocabulary. At first a somewhat

vague designation of little understood and but slightly appreciated principles, it has now come to characterize a very definite, practical movement that has for its object the rational development and wise use of the sources of nature wealth on which rest the material well-being of the Nation.

Conservation deals primarily with the four great classes of natural resources, lands, water, forests and minerals, but it has rightly been extended to include as well the consideration of means looking to the safe-guarding of public health and to the increasing of our vitality as a nation.

In his message to Congress transmitting the report of the National Conservation Commission, President Roosevelt said: "To be fearless, to be just and to be efficient are the three great requirements of national life. National efficiency is the result of natural resources well handled, of freedom, of opportunity for every man, and of the inherent capacity, trained ability, knowledge and will collectively and individually to use that opportunity. Conservation has been defined as the application of common sense to common problems for the common good. If this description is correct, then Conservation is the great fundamental basis for National efficiency."

In that its essential aim and purpose is the permanent betterment of all the people, Conservation has been termed the "new patriotism," while another definition of the purpose of the movement has added to a time-honored phrase a few additional words of pregnant significance—the greatest good of the greatest number *for the longest time*.

The purpose of the present paper is to outline briefly the growth of Conservation as a definite movement, to summarize the principles for which it stands and to indicate the trend that events seem now to be taking.

Conservation is a broad and comprehensive subject and touches various fields of endeavor at many points. It has many ramifications, but the broad outlines are clear and the fundamental principles are simple. The chief danger that Conservation has now to fear is that attention may be distracted from these few simple, fundamental principles by some interesting or temporarily exciting side issue. In this paper the effort will be made—as it should always be made in any serious consideration of Conservation problems—to stick to the big, simple, central truths, for it is on these that rest the foundations of our prosperity.

THE UNDERLYING PRINCIPLES OF CONSERVATION.

Conservation as it has come to be understood deals essentially with the right use of such of the four great sources of natural wealth, lands, water, forests and minerals, as still remain in public ownership. Until very recently we as a nation have been in the pioneer stage and necessarily have looked at things from the pioneer standpoint. But of late we have come to realize that the

bounty of Nature was not inexhaustible. With the developments of recent years, the gradual settlement of the West, the increase of facilities for transportation, and most of all in the better understanding of the relation between the right use of the natural resources and continued economic prosperity, a new view point has been reached which necessitates the readjustment of our attitude on a number of subjects. We find that we may have now to revise laws that have long been on the statute books; laws without which the Nation could never have reached its present stage of development. Primarily, it has come to be seen that the remaining sources of material wealth ought to be rationally developed and systematically exploited, not for the benefit of the few but in the interest of all the people, their rightful owners. Certain of the natural resources, if once exhausted may be replaced. Forests can be made to grow again and streams that have wasted away because their watersheds were denuded of vegetation can be renewed—albeit only with the expenditure of long time and heavy labor. Other resources, like coal and oil and phosphate deposits, and in many places the soil itself when lost through unchecked erosion, are gone forever.

The object of Conservation is to bring about the wise use of these resources of wealth so that they may serve man now and also in the days to come. It is no part of the plan to lock them up for the sole benefit of posterity, but rather to use them that those that are renewable shall be brought into ever better producing condition, and those that must in time be used up shall be made, while serving fully the needs of the present, to go as far as may be toward supplying the wants of the future. Above all Conservation stands for the retention by the people of the ultimate ownership in this great heritage. Let the development be by private capital by all means, under reasonable conditions and with grants of sufficient duration to permit justifiable profits, but never let such grants be made in perpetuity or without just compensation. These are the basic principles of Conservation—the objects for which the movement stands.

And the reason for it all is plain. With the rapid development following the application of science to modern industrial life, with the diminishing supply of many of the resources and the steadily increasing demand, it is essential that the people retain the ownership of the supplies of coal, wood and water that still vest in the Nation. By so doing absolute monopolistic control can be averted and the rights of the future safeguarded. If, however, the ownership of these things, more especially of the coal and the water powers, passes into private hands we and our children shall be at the mercy of the few as have never a people been before. The temptation for complete control through combination is too strong to be resisted. It is not what has so far been done that counts, but the liability—nay the practical certainty of what almost surely will happen if the tendencies of today are not

checked, that is the essence of the present situation. Conservation stands for remedying this condition before it becomes chronic. For unless the cure is applied and that speedily, it bodes ill for the future.

HISTORY OF THE CONSERVATION MOVEMENT.

Let us now trace briefly the history of the Conservation movement and the causes that have led us to the widespread attention that the subject is receiving today. It has already been said that Conservation has to deal primarily with the four main classes of natural resources, lands, waters, forests and minerals. It follows naturally that the Conservation movement is but the logical outgrowth of the efforts that have been made of late years for the better management of our forests, the wiser use of our streams and the more intelligent exploitation of our minerals. These efforts have largely followed the lead, if they have not actually been under the direction of Bureaus of two of the Federal Departments, the Geological Survey and the Reclamation Service of the Interior Department and the Forest Service of the Department of Agriculture. To the Geological Survey fell the task of mapping the lands, measuring the waters and studying the minerals on the public domain. To the Reclamation Service that of making available for homes, through the application of water, large areas of otherwise arid land. In all these lines of work able men have been busy for many years gathering the mass of information which paved the way to a better understanding of the problem before the Nation. Even more direct is the relation of the Forest Service to Conservation. This is not the place to set forth the development of the Forest Service from the days twelve years ago when a handful of propagandists gathered statistics and worked to arouse a dormant public, to the situation today, when over 194,000,000 acres of National forests are under efficient administration and many branches of forest work are all in active operation for the benefit of the people. In working out the problems of bringing the forested portion of the public domain under the systematic care of trained men much has been learned of the inter-relation of forests, lands and waters, which has led naturally into the allied but still wider fields of Conservation.

Based then on the findings and recommendations of the officials of the Geological Survey, the Reclamation Service and the Forest Service, the Conservation movement had its beginning in the better appreciation of the resources of the Nation, of their inter-relation and of the effect of their exhaustion on National prosperity. The rise of Conservation as a popular movement, in which the principles above outlined have begun to be felt in tangible form, dates from the appointment of the Inland Waterways Commission by President Roosevelt on March 14, 1907.

This Commission was asked "to prepare and report a comprehensive plan for the improvement and control of the river systems of the United States," and further, because "it is not possible to properly frame so large a plan as this for the control of our rivers without taking account of the orderly development of other natural resources" the Commission was asked to consider the relations of the streams to the use of all the great permanent natural resources and their conservation for the making and maintenance of prosperous homes."

The preliminary report of the Inland Waterways Commission was made to the President in February, 1908, was transmitted by him to Congress, and was published. The investigations of this body having made it apparent that the field to be covered was larger than could be handled by the Waterways Commission, President Roosevelt issued a call in November, 1907, for a Conservation Congress to be held at the White House in May, 1908, to which were invited the Governors of all the States, officials of various branches of the Federal Government, representatives from many organizations having to do with the natural resources, and delegates from each State, designated by the Governor. The conference lasted three days and was a memorable occasion in many ways, perhaps the most important feature being the precedent thereby established of occasional meetings of the Governors that bids fair to develop into a highly useful, if technically unofficial line of government activity. A declaration of principles was drawn up and approved that has been adopted as the charter as it were, of the Conservation Movement. The results of this conference were published by authority of Congress, as a stout volume during the summer of 1909.

Early in June, 1908, President Roosevelt reappointed and enlarged the Inland Waterways Commission and also created the National Conservation Commission, with four sections; water, lands, forest and minerals. This body at once undertook an inventory of the natural resources of the United States, which it completed in December, 1908. The report of the National Conservation Commission was submitted to President Roosevelt in January, 1909, and by him transmitted to Congress. The main report was accompanied by reports covering each of the sections and also by numerous papers prepared by experts in various lines. Again to quote from President Roosevelt's special conservation report message to Congress: "It is one of the most fundamentally important documents ever laid before the American people. It contains the first inventory of the natural resources ever made by any nation. In condensed form it presents a statement of our available capital in material resources, which are the means of progress, and calls attention to the essential conditions upon which the perpetuity, safety and welfare of this nation now rests and must always continue to rest. It deserves and should have the widest possible distribution among the people."

Notwithstanding this recommendation the Committee on Printing of the House of Representatives by refusing to report favorably the senate resolution for 25,000 copies did its utmost to withhold from the people the findings of the Conservation Commission. The edition in which the full report, including the experts' contributions, was printed, was so limited that it was only with the greatest difficulty that a copy can be obtained. The refusal freely to distribute this report was one of the overt acts of the opposition in the Conservation controversy.

Subsequent to the conference of the Governors in May, 1908, thirty-six of the States and Territories formed Conservation Commissions. In December, 1908, a second conference of Governors was called at Washington, at which meeting the findings of the National Conservation Commission was first made public. This conference adopted resolutions commending that report and urged on Congress the importance of taking action along lines following the recommendations of the Commission's report. At this meeting, too, was organized the Joint Committee on Conservation, designed to affiliate the several state commissions for effective action.

The next event of importance was the "Tawney amendments" to the Sundry Civil Bill, which became law on March 4, 1909. This prohibits the expenditure of public funds by or for any Commission not specially created by Congress and forbids government officials from assisting in the work of any commission otherwise appointed. This amendment effectually stopped the activities of the National Conservation Commission. But it did not stop the campaign, for the Joint Committee on Conservation, being an unofficial body, has continued the work of the National Conservation Commission by keeping the State Commissions in touch with one another and in general by acting as a clearing house for matters having to do with Conservation.

In February, 1909, a successful North American Conservation conference was held, attended by representatives of Canada, Mexico and the United States. The conference likewise united in a declaration of principles and made certain definite recommendations, one of which was that a World Conference of Conservation be called by the President. Mr. Roosevelt sounded the other nations and having received favorable replies it is likely that such a Congress will be held, probably at the Hague, during the autumn of 1910.

Last summer at Seattle there was formed the National Conservation Congress, a popular organization, designed to meet at intervals for the consideration and discussion of Conservation problems. This Congress is closely modelled on the National Irrigation Congress, of which it is really an outgrowth. It may be expected in future to become an agency to be reckoned with.

In the autumn of 1909 there was organized in New York the National Conservation Association, under the presidency of Dr.

Charles William Eliot, late president of Harvard University. The object of this association is to crystallize the interest of individuals into effective work for the furtherance of the Conservation movement. Recently President Eliot has retired, to be succeeded as President by Mr. Gifford Pinchot. By joining this society individuals who might not otherwise be able to help on the Conservation movement can render definite aid in a way that will count.

At the present time when the fundamental points at issue are in danger of being obscured temporarily by the dust raised by the battle over minor, tho' in themselves important issues, it is especially desirable that such an organization as the National Conservation Association should be given effective and hearty support. A very great deal depends on the passage by this Congress of the Conservation bills that are now awaiting action, especially that (Senate Bill 5485) authorizing the President to withdraw public lands of the United States from entry, and reserve them for public purposes. If this bill passes as reported, it makes certain the protection of the water powers, coal, oil and phosphate deposits still in public ownership, until good laws can be passed. Decisions of the Supreme Court and various opinions of Attorneys-General all go to show that the President has the inherent right to reserve public lands for public purposes. But of late this power has been doubted and questioned. The object of this proposed law is to make it definite and clear beyond all dispute that the President does possess the power of withdrawal. Only by the vigorous exercise of executive power can the people's property be effectively safeguarded, pending the enactment of laws adequate to the present needs. This bill is therefore the most important of the Conservation measures now before Congress. The National Conservation Association is engaged in an active campaign in favor of the passage of these Conservation bills and also of the defeat of certain other bills that have recently been introduced into Congress. The stronger the Association is in membership and funds, the more effectively can it carry out its program. Individuals can do little alone; organized, a few earnest men are a power. All of which, put in other words means that the friends of Conservation in Hawaii can, if they will, help as much as can those on the mainland.*

And here it may not be inappropriate parenthetically to remark that there are few parts of the Union where the factors of Conservation come so close to the average man as they do here in Hawaii. The whole economic fabric of this Territory is bound up with the right use of forests, waters and lands. Under our characteristic conditions of climate and topography an assured

* Membership in the National Conservation Association is two dollars a year; active members, five dollars. Mr. Hosmer will be glad to receive and forward the application of any one who would like to be enrolled.

and dependable supply of water rests absolutely on the continuance of the forests, and without water what would our agriculture amount to?

Next to using water and forests wisely, perhaps the greatest need in Hawaii is for a better understanding of the care of the land itself—the prevention of waste, the maintenance of fertility and the increase of soil productivity. With these material questions, we in Hawaii also face in a more intimate way than do many communities some of the larger questions of public health, which no less than these others are problems of Conservation. Thus the people of Hawaii are vitally concerned in this matter and should be ready to do their part in seeing to it that action is taken that will put the principles of Conservation into active practice.

THE POINTS AT ISSUE.

This brings the history of the movement down to the time of the present administration. Since the incoming of President Taft the progress of affairs has not been so smooth as under the last administration. It is a complicated situation that now obtains and the time is not yet when the end is in sight. For a correct understanding of the existing condition it is important that certain facts be got clearly in mind and that the essential points of variance be sharply differentiated from quarrels arising from the conflicting opinions of interested individuals, especially where these are concerned chiefly with the details of administration.

Practically, the conservation controversy boils down to three main issues:

First: Shall the remaining natural resources belonging to the Government, that is to the people of the United States, be administered in accordance with the best modern thought, in the interest of the nation, or shall they continue as in the past, to be exploited under laws that admittedly work to the benefit of speculators and adventurers and often lead to spoliation and graft. The necessary corollary to an effective attempt to handle the natural resources for the benefit of the people is that where the existing laws are unsuited or insufficient to secure the desired ends, new legislation must be enacted by Congress that shall enable such results to be attained. This is the question now before Congress.

Second: Granting that it is desirable that the remaining natural resources be handled in a more systematic and less wasteful manner than they have been in the past, or than they can be under existing laws, shall the attitude of the executive officer charged with the administration be that of the strict constructionist, who says in effect, "Is there any express and specific law authorizing or directing such action?" and who having found none, does nothing; or the attitude advocated by the law officers of the

Roosevelt administration who said, "Is there any justification in law for doing this desirable thing?" and having sought and found a legal justification, does what the public good demands be done. As Mr. Pinchot expressed it in his New Orleans speech last November: "It is the first duty of a public officer to obey the law, but it is his second duty, and a close second, to do everything the law will let him do for the public good."

It is on this point that the differences of opinion between Mr. Pinchot and Secretary Ballinger chiefly hinge, apart of course from any personal consideration that may have come in on either side. Mr. Ballinger is a strict constructionist who, while he declares himself to be strongly in favor of Conservation, holds that until there is specific law so to direct him, he may not legally take action, desirable though such action might be. Mr. Pinchot taking the other stand, says that unless the present laws specifically *forbid* doing this desirable thing, which is admittedly for the public good, let us, while working to get new and better laws enacted, take such action now, in line with the general intent of the whole body of the law, as will safeguard the public interests that are now in danger. Often it happens that to be effective such action must be taken without delay. While we are waiting for new laws to be enacted the land, the coal or the water powers may be permanently lost to the people, beyond recovery. Are we not justified then in using such tools as we now have—presidential orders, temporary withdrawals and the like, until we can get better, provided always that the action taken is in line with the spirit of the law and is for the public good.

Third: And this is really the big question, for public opinion has now been so aroused that few thinking men are willing to be reckoned as countenancing the continued waste of our natural resources—and the second question is, in the last analysis, after all but a phase of this larger question—this third question is then, "For whom are the natural resources to be exploited?" Are they for the permanent benefit and continued use of all the people, or are they to go to swell the private fortunes of a few greedy corporations? On the control of the remaining natural resources, more especially of the coal and the water powers, is going to depend pretty largely the outcome of the question, who is to determine the future development of the country? Is the control to rest with the people or with a merciless monopoly? This question therefore readily resolves itself into the still greater issue, Is this nation to be managed by men for human welfare, or by money for profit?

RECENT EVENTS.

To return now to the events of recent history. Just prior to going out of office Secretary Garfield set apart under an order of temporary withdrawal some 3,670,000 acres of public land con-

trolling water powers throughout the West. Being a blanket order the total area necessarily included many small areas of private land, which being owned in fee simple by individuals obviously could not be affected by the withdrawal, although embraced within the total area covered by the order. Soon after coming into office Secretary Ballinger revoked this order and turned back into the class of land open for entry a considerable part of the area that had been withdrawn. This led to protests from the Forest Service and others, as the result of which, after some delay, a portion of the original area was again withdrawn. One of the contentions made in regard to Secretary Ballinger is that the opening up of these lands gave unnecessary opportunity to certain corporations to make filings on land controlling streams from which hydroelectric energy can be developed. About this time, too, Secretary Ballinger revoked an arrangement between the Bureau of Indian Affairs and the Forest Service, whereby the forest lands belonging to certain tribes were being managed for the benefit of the Indians by the trained men of the Forest Service, under forest regulations. The Secretary claimed that this transfer of authority was not permissible, although it had previously been approved by the Secretaries of Agriculture and of the Interior. This action led to more ill feeling between the departments, which was still further added to by the charges made in August by Mr. L. R. Glavis, Chief of the Field Division of the Land Office, that the high officials of the Interior Department were unduly favoring the claimants of certain valuable coal lands in Alaska known as the Cunningham claims. The gist of this matter is that within the boundaries of one of the National forests of Alaska are highly valuable coal fields. Many of the entries made on these lands are suspected to have been fraudulent, through dummy entrymen and the like, but the claimants were pressing for the issuance of patents. Subsequent to his resignation as Land Commissioner and prior to his appointment as Secretary, Mr. Ballinger had been retained as counsel for the Cunningham interests. Briefly, Glavis' charges are that on his return to office the Secretary unduly favored these claimants. Mr. Glavis submitted his charges directly to the President, who in a long and carefully worded letter, issued in September, stated that he failed to find the charges substantiated. Accordingly he exonerated Secretary Ballinger of all blame. Glavis was thereupon dismissed from the public service. At the same time President Taft issued a letter endorsing the policy of Mr. Pinchot—Secretary Ballinger and Mr. Pinchot having crossed swords a few days earlier at the Irrigation Congress at Spokane and at other meetings.

Ever since the early summer Collier's Weekly, in company with two or three other magazines, had been waging a campaign of increasing hostility against Secretary Ballinger. This apparently culminated in an article by Glavis, published during the

autumn, in which he reiterated his charges against the higher officials of the Interior Department, when for a while things seemed to quiet down. In December Secretary Ballinger issued his annual report in which he recommends far reaching legislation in favor of Conservation. Indeed, his suggestions are in practical accord with the most advanced utterances of the extreme conservationists, the essential points recommended being the systematic classification of the public domain, new coal land laws, the repeal of the "Timber and Stone Acts," the amendment of the Carey Act, and a comprehensive outline of a law for the control and administration of water power sites.

But the stream though calm on the surface was troubled. Criticism of the Interior Department did not cease, and finally in December came the demand for an investigation. After a vigorous debate in Congress the scope of this investigation was widened to include the Forest Service in the Agricultural Department as well as the Department of the Interior. While the appointment of the investigating committee was under discussion in Congress, a letter from Mr. Pinchot was read on the floor of the Senate by Senator Dolliver of Iowa, in which Mr. Pinchot in defending two of his subordinate officers in the Forest Service, Mr. Overton W. Price, Associate Forester, and Mr. A. C. Shaw, Law Officer, both of whom had been active in keeping up the fight for the retention by the Government of the Cunningham claims, openly championed Glavis as a "most vigorous defender of the people's interests." This letter led President Taft, on January 7, to dismiss Mr. Pinchot, together with Messrs. Price and Shaw, from the Forest Service on the ground of insubordination.

A few days later the President transmitted to Congress a strong message in favor of Conservation, recommending that the suggestions in Secretary Ballinger's report be carried out. Simultaneously bills prepared under the direction of the President were introduced into Congress. These bills are now awaiting action, being items on the program of legislation advocated by the administration. The more important bills meet with the approval of the leading exponents of Conservation and whatever the outcome of the present investigation of the Interior Department, ought to be enacted into law. As has already been pointed out, the revision and amendment of the existing laws relating to the natural resources is of the utmost importance and must not be lost sight of in the dust raised by the side issues of this controversy.

President Taft has repeatedly shown his belief in the principles of Conservation. A further evidence of his attitude was the appointment (to succeed Mr. Pinchot) as Forester of the Agricultural Department, of Henry S. Graves, Director of the Yale Forest School. Unquestionably next to Mr. Pinchot, Prof. Graves is the most prominent forester in the United States.

From his training, experience and long intimate association with Mr. Pinchot in forest work, the nation may rest assured that under Mr. Graves not only will the National forests be sanely and efficiently administered, but also that the policies inaugurated by Gifford Pinchot will be continued and carried out.

This brings the matter down to date for the investigation of the Interior Department now going on in Washintgon does not fall within the scope of this paper. The questions there involved are but incidental to the main problem that now awaits to be settled; they constitute only a small part of the Conservation controversy. Until the investigation of the Interior Department is completed, the conservative thing is obviously to suspend judgment on the Secretary of the Interior, for before the investigation is over there should be ample opportunity for all the facts to be made known. It ought, however, to be said that to get at the truth of the matter one should rely on a study of the full report of the hearings and not on the faulty and often garbled accounts that appear in the newspapers.

CONCLUSION.

In this hasty and necessarily imperfect sketch of the Conservation controversy many points have been passed over, but I think I have given the essential facts. It remains now only to direct attention to two points and I am done. Whatever the outcome of the investigation of the Interior Department, that investigation is, considered broadly, but a side issue. Similarly the dismissal of Mr. Pinchot is not the reason nor the cause of the Conservation controversy. The difference of opinion between Mr. Ballinger and Mr. Pinchot—assuming that Mr. Ballinger is as sincere in his protestations in favor of Conservation as it is universally admitted that Mr. Pinchot is—is after all one as to method. The cause of the controversy lies far deeper.

It cannot too often be said that the real questions at issue are these: First: Shall the remaining natural resources be conserved? And second: If so, shall they not be administered for the benefit of all the people rather than for the use and profit of greedy monopolies? These are the questions that are before Congress; the issues that confront the nation. Unless action is taken, and that speedily, damage will be done that will be irreparable. Unless new laws are enacted the coal, phosphate deposits, minerals, oil and water powers remaining in public ownership will pass into private control and be lost forever to the people as a whole. The issue is one that touches the very life of the nation. The time for action is now. It is the duty of every man to be awake and to do his part.

PROCLAMATION OF FOREST RESERVE IN THE KOOLAULOA DISTRICT, ISLAND OF OAHU.

Under and by virtue of the authority vested in me by the provisions of Chapter 28 of the Revised Laws of the Territory of Hawaii, as amended by Act 65 of the Session Laws of 1905, and by Act 4 of the Session Laws of 1907, and of every other power me hereunto enabling, I, WALTER F. FREAR, Governor of Hawaii, having held the hearing of which notice has been duly given as in said acts provided, do hereby SET APART as a Forest Reserve, to be called the "PUPUKEA FOREST RESERVE," that portion of land in the District of Koolauloa, Island of Oahu, Territory of Hawaii, known as the remainder of Pupukea-Paumalu, embracing and including the section immediately mauka of the Pupukea-Paumalu Homesteads, approximately 790 acres, together with the three Water Reserves, A, B, and C, in the said Homestead Tract, and containing altogether an area of 864 acres, more or less, in the District of Koolauloa, City and County of Honolulu, Island of Oahu, Territory of Hawaii; more particularly described by and on a map made in April, 1910, by the Government Survey Department of the Territory of Hawaii, which said map is now on file in the said Survey Department marked "Government Survey Registered Map No. 2252" and "Pupukea Forest Reserve," and descriptions accompanying the same, numbered C. S. F. 2137, which said descriptions, now on file in the said Survey Department, are as follows:

PUPUKEA FOREST RESERVE.

Beginning at an inch pipe on a hill in the ridge bounding the lands of Paumalu and Kaunala and at the east corner of Lot 23 of the Pupukea-Paumalu Homesteads, from which pipe the true azimuth and distance to Government Survey Trig. Station "Waialea" is $162^{\circ} 43' 30''$ 10244.0 feet, as shown on Government Survey Registered Map No. 2252, and running by true azimuths:

1. Up along the ridge along the land of Kaunala "Puu Moa" a point in the ridge at the head of the Paumalu Gulch, the direct azimuth and distance being: $328^{\circ} 00'$ 6785.0 feet;
2. Thence down the ridge along the land of Waimea to "Puu Ki" a point in the ridge at the head of the land of Pupukea, the direct azimuth and distance being: $86^{\circ} 10'$ 6660.0 feet;
3. Thence along the crest of the ridge along the land of Waimea (by agreement) to the fence corner at the east corner of Lot 19 of the Pupukea-Paumalu Homesteads, the direct azimuth and distance being: $133^{\circ} 16'$ 1376.6 feet; and the coördinates of said point referred to "Pupukea" Trig. Station are 5813.6 feet South and 7303.7 feet East;
4. $149^{\circ} 31'$ 965.6 feet along homestead road to an inch pipe;
5. $158^{\circ} 41'$ 426.7 feet along homestead road to a stake;
6. $134^{\circ} 30'$ 1454.0 feet along homestead road to an inch pipe;
7. $224^{\circ} 30'$ 92.0 feet along homestead road to a stake;
8. $314^{\circ} 27'$ 192.0 feet along homestead road to a stake;
9. $265^{\circ} 57'$ 77.0 feet along homestead road to a stake;
10. $295^{\circ} 50'$ 174.5 feet along homestead road to a stake;
11. $319^{\circ} 45'$ 146.0 feet along homestead road to a post;
12. $257^{\circ} 02'$ 77.0 feet along homestead road across gulch to a stake;
13. $164^{\circ} 40'$ 168.0 feet along homestead road to a stake;
14. $146^{\circ} 30'$ 375.0 feet along homestead road to a stake;
15. $218^{\circ} 16'$ 142.5 feet along homestead road to a stake;
16. $113^{\circ} 03'$ 155.0 feet along homestead road to a stake;
17. $151^{\circ} 37'$ 58.8 feet along homestead road to a stake;

18. 184° 25' 240.0 feet along homestead road to an inch pipe, the coördinates of which referred to "Pupukea" Trig. Station are 2861.0 feet South and 5909.3 feet East;
 19. 225° 00' 672.0 feet along Lot 21 of the Pupukea-Paumalu Homesteads across the Kaleleiki Gulch to an iron pipe on edge of same;
 20. 275° 30' 852.0 feet along same along bluff to an iron pipe;
 21. 219° 37' 300.0 feet along same to an iron pipe;
 22. 270° 01' 30" 2218.0 feet along same down bluff to the center of the Paumalu Stream, and up bluff along Lot 22 to an iron pipe;
 23. 225° 46' 2417.0 feet along Lots 22 and 23 and across the Aimuu Gulch to the point of beginning.
- Area, 790 acres.

WATER RESERVE "A"—PUPUKEA-PAUMALU HOMESTEADS,
KOOLAULO, OAHU.

Beginning at a post on the West line of this reserve, the East corner of Lot 4 and the South corner of Lot 3B, from which the true azimuth and distance to "Pupukea" Trig. Station is 39° 13' 2389.0 feet as shown on Government Survey Registered Map No. 2252, and running by true azimuths:

1. 215° 45' 50.0 feet along Lot 3B;
 2. 317° 23' 1132.0 feet along Lot 5 to a post;
 3. 35° 45' 608.5 feet along Lot 5 to a post;
 4. 140° 12' 1145.0 feet along Lot 5 to a post;
 5. 215° 45' 501.0 feet along Lot 4 to the point of beginning.
- Area, 14 10-100 acres.

Excepting and reserving therefrom that portion of the 30-foot Homestead Road within this Reserve, leaving a net area of 13 33-100 acres.

WATER RESERVE "B"—PUPUKEA-PAUMALU HOMESTEADS,
KOOLAULO, OAHU.

Beginning at a post at the South corner of this reserve, from which the true azimuth and distance to "Pupukea" Trig. Station is 83° 40' 30" 3980.0 feet, as shown on Government Survey Registered Map No. 2252, and running by true azimuths:

1. 110° 25' 1035.5 feet along Lot 6A to a post;
 2. 217° 01' 30" 471.0 feet long Lot 5 to a post;
 3. 279° 36' 1118.0 feet along Lot 6A to a post;
 4. 37° 01' 30" 690.0 feet along Lot 6A to the point of beginning.
- Area, 13 4-10 acres.

WATER RESERVE "C"—PUPUKEA-PAUMALU HOMESTEADS,
KOOLAULO, OAHU.

Beginning at a point on the South side of the Kanawaikaala Gulch, the Southwest corner of this piece and the Southeast corner of Lot 7 of the Pupukea-Paumalu Homesteads, and on the North side of 50-foot homestead road, the coördinates of said post referred to "Pupukea" Trig. Station being 5110.2 feet South and 4882.0 feet East, as shown on Government Survey Registered Map No. 2252, and running by true azimuths:

1. 188° 14' 1226.0 feet along said Lot 7 to post on North edge of Kana-waikaala Gulch;
2. 215° 25' 1220.0 feet along said Lot 7 to a post on the North edge of the Waihuena Gulch, from which the true azimuth and distance to "Puu Waihuena" Trig. Station is 145° 29' 1722.0 feet;

3. 278° 10' 80.0 feet along South side of 50 foot homestead road;
 4. 4° 25' 175.0 feet along same;
 5. 339° 50' 103.0 feet along same;
 6. 298° 30' 96.0 feet along same;
 7. 24° 00' 109.0 feet along same;
 8. 330° 45' 252.0 feet along same;
 9. 317° 00' 105.0 feet along same;
 10. 45° 30' 21.0 feet along West side of said road;
 11. 107° 25' 190.0 feet along North side of said road;
 12. 85° 50' 65.0 feet along North side of said road;
 13. 134° 30' 172.0 feet along North side of said road;
 14. Thence along the West side of said road on a curve to the left having a radius of 96.0 feet, the direct azimuth and distance being: 44° 30' 192.0 feet;
 15. 314° 30' 1452.0 feet along South side of said road;
 16. 338° 41' 596.0 feet along South side of said road to post at junction;
 17. 123° 38' 661.0 feet along North side of said road;
 18. 94° 00' 243.8 feet along North side of said road;
 19. 52° 19' 200.8 feet along North side of said road;
 20. 25° 16' 248.8 feet along North side of said road;
 21. 65° 08' 276.3 feet along North side of said road;
 22. 102° 16' 651.5 feet along North side of said road to the point of beginning.
- Area, 47 1-10 acres.

IN WITNESS WHEREOF, I have hereunto set my hand and caused the Great Seal of the Territory of Hawaii to be affixed. Done at the Capitol in Honolulu, this 10th day of May, A. D. 1910.

W. F. FREAR,
Governor of Hawaii.

By the Governor,

E. A. MOTT-SMITH,
Secretary.

Office: Brewer Building, Queen St.
Works Iwilei,

Telephone 430.
Telephone 272

The Hawaiian Fertilizer Co., Ltd.

HONOLULU, HAWAII.

MANUFACTURE AND DEAL IN ALL KINDS OF
Fertilizer and Fertilizer Ingredients
INCLUDING :

Bone Meal,	Sulfate Ammonia,
Nitrate Soda,	Sulfate Potash,
Double-Superphosphate,	Dissolved Guano,
Ground Limestone, etc., etc.	

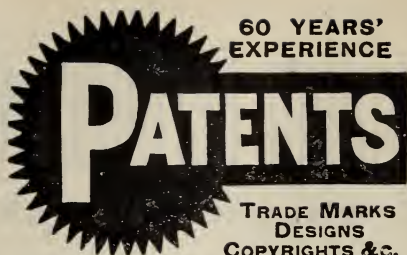
BOARD OF DIRECTORS :

Chas. M. Cooke, President,	E. F. Bishop, Treasurer,
E. D. Tenney, Vice-President,	J. Waterhouse, Secretary,
Geo. H. Robertson, Auditor,	
W. M. Alexander	
C. H. Atherton,	
E. F. Bishop, Managing Director,	
Norman Watins, General Superintendent	

The products of this company are equal in every respect to any fertilizers sold in any market. In none of the conditions are they ranked by those manufactured elsewhere.

We will be pleased to furnish analysis of the soil of any locality in the Territory and make special fertilizers for different soil products arranging the composition to suit conditions.

Prices and Terms on Application.



Anyone sending a sketch and description may quickly ascertain our opinion free whether an invention is probably patentable. Communications strictly confidential. **HANDBOOK** on Patents sent free. Oldest agency for securing patents. Patents taken through Munn & Co. receive special notice, without charge, in the

Scientific American.

A handsomely illustrated weekly. Largest circulation of any scientific journal. Terms, \$3 a year; four months, \$1. Sold by all newsdealers.

MUNN & Co. 361 Broadway New York
Branch Office, 625 F St., Washington, D. C.

Garden and Farm Tools and Implements

To do good farming you must have up to date tools to work with. We carry a most complete line of everything needed by the small or large farmer, from the smallest hand trowel to the largest cane plow. We also have a good assortment of Hand, Bucket or Barrel Sprayers. Our assortment of Hoes, Shovels, Spades, Mattocks, Rakes, Garden Shears, Lawn Mowers, Garden Hose, and other things that are needed daily about the farm or garden, is most complete and our stock large.

E. O. HALL & SON, LTD.

Board of Agriculture and Forestry.

PUBLICATIONS FOR DISTRIBUTION.

Any one or all of the publications listed below (except those marked *) will be sent to residents of this Territory, free, upon application to Mailing Clerk, P. O. Box 331, Honolulu.

BOARD.

- Report of the Commissioner of Agriculture and Forestry for 1900; 66 pp.
Report of the Commissioner of Agriculture and Forestry for 1902; 88 pp.
* First Report of the Board of Commissioners of Agriculture and Forestry, from July 1, 1903, to December 31, 1904; 170 pp.
Second Report of the Board of Commissioners of Agriculture and Forestry, for the year ending December 31, 1905; 240 pp.; 8 plates; 10 text figures.
Third Report of the Board of Commissioners of Agriculture and Forestry, for the year ending December 31, 1906; 212 pp.; 3 plates; 4 maps; 7 text figures.
Fourth Report of the Board of Commissioners of Agriculture and Forestry, for the calendar year ending December 31, 1907; 202 pp.; 7 plates.
Fifth Report of the Board of Commissioners of Agriculture and Forestry, for the calendar year ending December 31, 1908; 218 pp.; 34 plates.
"Notice to Importers," by H. E. Cooper; 4 pp.; 1903.
"Digest of the Statutes Relating to Importation, Soils, Plants, Fruits, Vegetables, etc., into the Territory of Hawaii." General Circular No. 1; 6 pp.
"Important Notice to Ship Owners, Fruit Importers and Others. Rules and Regulations Prohibiting the Introduction of Certain Pests and Animals into the Territory of Hawaii." General Circular No. 2; 3 pp.; 1904.
"Law and Regulations, Importation and Inspection of Honey Bees and Honey." General Circular No. 3; 7 pp.; 1908.
"The Hawaiian Forester and Agriculturist," a monthly magazine. Vols. I to VI; 1904-1909. To be obtained from the Hawaiian Gazette Co., Honolulu. Price \$1 a year.

DIVISION ON ENTOMOLOGY.

- "The Leaf-Hopper of the Sugar Cane," by R. C. L. Perkins. Bulletin No. 1; 38 pp.; 1903.
** "A Catalogue of the Hemipterous Family Aleyrodidae," by G. W. Kirkaldy, and "Aleyrodidae of Hawaii and Fiji with Descriptions of New Species," by Jacob Kotinsky. Bulletin No. 2; 102 pp.; 1 plate; 1907.
* "On Some Diseases of Cane Specially Considered in Relation to the Leaf-Hopper Pest and to the Stripping of Cane," by R. C. L. Perkins. Press Bulletin No. 1; 4 pp.; 1904.
"A Circular of Information," by Jacob Kotinsky. Circular No. 1; 8 pp.; 1905.
"The Japanese Beetle Fungus," by Jacob Kotinsky and B. M. Newell. Circular No. 2; 4 pp., cut; 1905.
Report of the Division of Entomology, for the year ending December 31, 1905. Reprint from Second Report of the Board; 68 pp.; 3 plates; 10 text figures.
Report of the Division of Entomology, for the year ending December 31, 1906. Reprint from Third Report of the Board; 25 pp.; 7 text figures.
Report of the Division of Entomology, for the year ending December 31, 1907. Reprint from Fourth Report of the Board; 18 pp.; 1 plate.
Report of the Division of Entomology, for the year ending December 31, 1908. Reprint from Fifth Report of the Board; 26 pp.; 2 plates.

DIVISION OF FORESTRY.

- * "Forest and Ornamental Tree Seed for Sale at Government Nursery." Press Bulletin No. 1; 3 pp.; 1905.
* "Suggestions in Regard to the Arbor Day Tree Planting Contest." Press Bulletin No. 2; 7 pp.; 1905.
"An Offer of Practical Assistance to Tree Planters." Circular No. 1; 6 pp.; 1905.
"Revised List of Forest and Ornamental Tree Seed for Sale at the Government Nursery." Press Bulletin No. 3; 4 pp.; 1906.
* "Instructions for Propagating and Planting Forest Trees." Press Bulletin No. 4; 4 pp.; 1906.
"Instructions for Planting Forest, Shade and Ornamental Trees." Press Bulletin No. 5; 7 pp.; 1909.
"Na Hoakaka no ke Kanu Ana i na Laau Malumalu ame na Laau Hoohiwahiwa." Press Bulletin No. 6; 8 pp.; 1909.
Report of the Division of Forestry, for the year ending December 31, 1905. Reprint from Second Report of the Board; 77 pp.; 5 plates.
* Report of the Division of Forestry, for the year ending December 31, 1906. Reprint from Third Report of the Board; 123 pp.; 4 maps.
Report of the Division of Forestry, for the year ending December 31, 1907. Reprint from Fourth Report of the Board; 70 pp.
Report of the Division of Forestry, for the year ending December 31, 1908. Reprint from Fifth Report of the Board; 85 pp.

** This Bulletin will be sent only to persons interested in the subject.

* Out of print.

Board of Agriculture and Forestry.

PUBLICATIONS FOR DISTRIBUTION—Continued.

DIVISION OF ANIMAL INDUSTRY.

- * "Inspection of Imported Live Stock." Rule 1; 1 p.; 1905.
- * "Inspection and Testing of Imported Live Stock for Glanders and Tuberculosis." Rule 2; 1 p.; 1905.
- "Concerning Glandered Horse Stock in the Territory." Rule 3; 1 p.; 1905.
- * "To Amend Rule 1, Inspection of Imported Live Stock." Rule 4; 1 p.; 1907.
- "Rules and Regulations, Inspection and Testing of Live Stock." Rules and Laws; 11 pp.; Revised; 1910.
- "Quarantine of Horse Stock from California." Rule 8; 1 p.; 1908.
- Report of the Division of Animal Industry, for the year ending December 31, 1905.
Reprint from Second Report of the Board; 62 pp.
- Report of the Division of Animal Industry, for the year ending December 31, 1906.
Reprint from Third Report of the Board; 41 pp.; 3 plates.
- Report of the Division of Animal Industry, for the year ending December 31, 1907.
Reprint from the Fourth Report of the Board; 104 pp.; 6 plates.
- Report of the Division of Animal Industry, for the year ending December 31, 1908.
Reprint from Fifth Report of the Board; 44 pp.

DIVISION OF FORESTRY.

FOREST AND ORNAMENTAL TREE SEED AND SEEDLINGS FOR SALE AT THE GOVERNMENT NURSERY.

The Division of Forestry keeps constantly on hand at the Government Nursery, seed and seedlings of the important native and introduced trees. These are sold at prices just covering the cost of collection or growing.

The list includes both forest and ornamental trees, such as Silk Oak, Koa, various species of Eucalyptus, Golden and Pink Showers, Pride of India, Poinciana, Albizzia, etc. The price of the seed varies from 10 to 50 cents per ounce. The seedlings may be had for 2½ cents each, except a few kinds which are 5 cents. Seed of the various palms is also for sale; the price per 100 varying from \$1.00 to \$2.50. All seed is tested before being sent out, which insures its being good.

All communications in regard to seed or trees should be addressed to David Haughs, Forest Nurseryman, Box 331, Honolulu, Hawaii.

RALPH S. HOSMER,
Superintendent of Forestry.

DIVISION OF ENTOMOLOGY.

To give information about insects free of charge is one of the duties of this Division and Hawaiian readers are hereby invited to make inquiry in person and by mail. In order to be able to advise intelligently or send the right kind of useful insects for relief we like and sometimes it is indispensable for us to see the insect suspected or caught in the act, also specimens of the injury. In a tin with a hole or two, or a wooden box specimens may be mailed at 3rd class rates. When specimens are not accompanied by letter *always* write your name and address in the upper left-hand corner of the package. Address all communications SUPERINTENDENT DIVISION OF ENTOMOLOGY, P. O. BOX 331, HONOLULU, HAWAII.

EDW. M. EHRHORN,
Superintendent.

VOL. VII

JUNE, 1910

No. 6

Price, 10c. Per Copy; Per Annum, \$1.00; Foreign, \$1.25.

THE
Hawaiian Forester
AND
Agriculturist

A MONTHLY MAGAZINE

OF

Forestry, Entomology and Agriculture

ISSUED UNDER THE DIRECTION

OF THE

BOARD OF COMMISSIONERS OF AGRICULTURE
AND FORESTRY.

PUBLISHED MONTHLY.

Entered as second-class matter at the Post office, at Honolulu, Hawaifi.

ADDRESS ALL COMMUNICATIONS TO

DANIEL LOGAN,
EDITOR "THE FORESTER,"

P. O. BOX 366,
HONOLULU, H. T.

For business relating to advertising or subscriptions, address

HAWAIIAN GAZETTE CO., LTD., Publishers,
VON HOLT BLOCK, 65 S. KING ST., HONOLULU, HAWAII.

OFFICERS AND STAFF OF THE BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY.

Marston Campbell, *President and Executive Officer.*
J. M. Dowsett P. R. Isenberg
H. M. von Holt

Ralph S. Hosmer, *Superintendent of Forestry and Chief Fire Warden.*
David Haughs, *Forest Nurseryman.*
Joseph F. Rock, *Botanical Assistant.*
Louis Margolin, *Forest Inspector.*
David Kapihe, *Forest Ranger for Tantalus.*

Edward M. Ehrhorn, *Superintendent of Entomology and Chief Inspector.*
 Albert Koebele, *Consulting Entomologist.*
 *Assistant Entomologist.*
 D. B. Kuhns, *Inspector's Assistant.*
 Louis Lewis, *Assistant in Inspection.*
 Fred Muir, *Beneficial-Insect Collector.*
 Bro. M. Newell, *Fruit and Plant Inspector, Hilo, Hawaii.*
 Robert R. Elgin, } *Mahukona, Hawaii.*
 W. O. Aiken, } *Honorary Fruit Kahului, Maui.*
 W. D. McBryde, } *and Plant Inspector Koloa, Kauai.*
 Dr. W. B. Deas, } *at Hana, Maui.*
 Wm. Robb, } *Lahaina, Maui.*

Victor A. Nørgaard, *Superintendent of Animal Industry and Territorial Veterinarian.*
L. N. Case, *Assistant Territorial Veterinarian.*
John Vanhuizen, *Live Stock Inspector.*
J. C. Fitzgerald, *Deputy Territorial Veterinarian for Maui.*
H. B. Elliot, *Deputy Territorial Veterinarian for Hawaii.*
A. R. Glazzyer, *Deputy Territorial Veterinarian for Kawai.*

Miss Ella K. Dayton

THE HAWAIIAN FORESTER *and* AGRICULTURIST

VOL. VII

JUNE, 1910

No. 6

The U. S. Department of Agriculture's recent publication on "The Anatomy of the Honey Bee" embodies the results of detailed studies and should prove of value as bringing to beekeepers reliable information concerning an insect of such great economic importance, and also as furnishing a sound basis in devising new and improved practical manipulations. The subject has been for years the object of study of many careful students; but the popular demand for information has also induced untrained men to write accounts of bee anatomy containing numerous errors, and illustrated by drawings more artistic than accurate. The text of the bulletin here mentioned is profusely illustrated, fifty-seven figures, including a full page median longitudinal section of the body of worker, being used, all but three of which are new and original, having been prepared by the author with a thorough realization of the need of more accurate illustrations of the organs of the bee, especially of the internal organs. This bulletin can be secured only from the Superintendent of Documents, Government Printing Office, as the Department's supply is by law limited to an edition barely sufficient to furnish libraries and the collaborators of the Department with copies.

The Yearbook for 1909 just issued is the sixteenth volume under that title from the U. S. Department of Agriculture. The current volume does not differ materially from its predecessors except that its size has been reduced—this issue showing about 200 pages less than the 1908 volume. This reduction was accomplished not by reducing the number of articles but by the greatest possible condensation of the matter in those printed and the elimination from the appendix of certain less important features.

AN EVENTFUL YEAR.

This year is eventful for agricultural development in Hawaii in the direction of having the land peopled with tillers of the soil who will form a backbone of citizenship. Hitherto agricultural expansion in the islands has taken the form of tillage of

large estates by corporations and individual capitalists with cheap labor of classes largely ineligible, or at least indisposed, to citizenship of Hawaii and the United States. Conditions and events now seem to have converged into a situation where a revolution, not necessarily sudden, may be expected to take place in the agricultural status of these islands. It will be in two grand divisions. The first one will affect the present main industry of cane sugar production, the second will manifest itself in stimulation of diversified industries of the soil. Sugar cane will continue to be grown and ground on large plantations, but some of these will become in whole or in part groups of small farms owned by the cultivators. Corporations will retain the manufacture of sugar, or else leave it to coöperation of the small farmer groups—most likely the former arrangement prevailing at least for a long time to come. Large plantations whose land is owned by the present capitalistic operators will more and more come to derive their labor from the independent farming population and such elements capable of citizenship as will immigrate hither with a view to becoming industrial settlers. Some of them, it is not improbable, will be moved by examples of other plantations composed of cane farms successfully worked by the owners to portion out their estates among settlers upon some basis of permanent tenure conditional on their raising sugar cane for the corporation mill.

An event of this year which tends to the changes in the sugar industry just mentioned is the passage by Congress of amendments to the Organic Act which affect the administration of Hawaiian public lands. For some years past, as the old and cheap leases of government land held by sugar plantations have fallen in, such renewals as were granted contained a clause enabling the government to cancel the lease when it might be deemed expedient to open the land for homesteading purposes. There was nothing binding upon the government, however, to require homesteading of the land. In some cases the leaseholds were surrendered for homesteading at the outset, but somehow or other many purchasers or lessees of homesteads failed to maintain their holdings. Still there was the restriction of the Organic Act which prevents a corporation from owning more than one thousand acres, so that over that limit the corporation could only regain control of the land under lease with the homestead clause in it. One of the land law amendments of the Organic Act is to make the homesteading of public lands compulsory on the government whenever twenty-five citizens make application for homesteads upon a particular tract. This materially changes the status of lands held as leaseholds by sugar planters, who must now give the lands up whenever the required number of intending homesteaders apply for them. It is easy to see then that if the corporations occupying public lands are to continue to derive sugar cane therefrom, they can only do so by amicable arrangement

with the homesteaders among whom the lands are apportioned. There are enough corporately held sugar estates in the Territory whose holdings are public lands, on which the leases will expire within a short time, to make a thorough test of the feasibility of making sugar profitably from cane raised by independent farmers. Failure will mean an end of some sugar producing companies, and success a revolutionary change—one immensely advantageous to the general interests of the Territory—in the Hawaiian sugar industry. Not the least benefit from success would be an intrinsic one to the industry, from the increased yield of cane through the intensive cultivation that tillers of their own soil would give. This is being demonstrated now in Queensland.

Other events of the year, partly related to that just considered, and affecting diversified farming as well as sugar raising, may be briefly stated. First is the beginning of conservation work in the islands by Federal experts at Territorial expense. This service is certainly destined to add considerably to the limited area of cultivable land in the Territory, making more room for producing citizen settlers. Next is the work of the Commission on Advances to Homesteaders, which has resulted in a report just rendered to the Executive covering three bills for submission to the Legislature. The commission finds that the measure to provide for money advances to homesteaders proposed would likely be unconstitutional. In lieu of such a law they submit three bills, all designed to assist and encourage the homesteader. One is for provision by the Territory of cheap transportation for the settler whereby he may profitably market his products. Another measure is to provide for making improvements on homesteads in advance of sale, so that the settler may find shelter, water, fences, etc., on the homestead he buys. The third is to reduce the interest on deferred payments to the Territory by the homesteader to five per cent. per annum.

Among conditions joining with events in making hopeful auspices for general farming development a few only need be stated. There is the pioneer work already done by enterprising individuals and corporations, which has fairly demonstrated the capability of Hawaiian soil to yield profitably of various staples having either local or world markets. With such pioneer work in fruit, cotton, rubber, tobacco, copra, etc., is also to be considered the practical investigating, experimenting and educating work of the Territorial Experiment Station and the College of Hawaii, which obviates for the homesteader to a very great extent the necessity of passing through the painful experience of the oldtime pioneer in new country development. It is all especially valuable service for the newcomer into tropical agriculture. Lastly, mention may be made of the immense expansion of the home market for food products which has taken place here within a few years, and is still in progress, in the advent of large military forces for permanent stationing here, the con-

struction of a great drydock and dockyard works for the navy, the growth of tourist traffic and hotel business, the new railway projects and the rapid increase of town populations. Truly, if ever there was a country holding brilliant promise for its domiciled farmers at any time, Hawaii is in such happy situation in this eventful year of its development.

Tropical Life says: "King George V., as the Prince of Wales, signified his willingness to become the Patron of the Second International Rubber Exhibition to be held in London in June next year (1911). We believe further that we are correct in saying that His Majesty expressed his pleasure in becoming the Patron." Hawaii ought surely to be represented at this exhibition, especially, as shown in another paragraph, she is aiding in enlightening the world on rubber.

Mention was made, in a former issue, of the frequent notice given to Hawaii in exchanges throughout the world. Tropical Life (London) for May contains an article of nearly two pages on "Caravonica Cotton," of which fully one-third relates to cotton experiments here. Director E. V. Wilcox of the Hawaii Experiment Station, Mr. F. G. Krauss and Mr. E. C. Smith, of Pearl City, are all quoted as authorities on different points. Mr. Wilcox, at the second place quoted, is spoken of as having "succeeded our old friend Mr. Jared Smith (see 'Our Friend' in Tropical Life for April, 1907), as agent in charge out in Hawaii." The same number of Tropical Life contains a serial article on rubber which largely consists of information from Hawaii. Messrs. E. V. Wilcox and Jared Smith are quoted therein as authorities in rubber lore. There is also a letter to the editor from Mr. C. F. Eckart, director of the Hawaiian Sugar Planters' Association Experiment Station, on "Sugar Yields in Hawaii." To have five of her resident agricultural experts appearing as authorities in one issue of one of the finest agricultural magazines in the world is no small fame for little Hawaii.

BOARD OF AGRICULTURE AND FORESTRY.

DIVISION OF FORESTRY.

The Board of Commissioners of Agriculture and Forestry,
Honolulu, Hawaii:

Gentlemen:—I have the honor to submit a report covering the work of the Division of Forestry for the months of April and May, 1910.

EUCALYPTUS INVESTIGATION.

Having completed the field work incident to the investigation of the groves of planted Eucalyptus on Hawaii, Maui, Oahu, and Kauai, Mr. Louis Margolin returned to Honolulu early in April to work up the data and prepare his report. This he completed just prior to his departure for California on May 8, where he returns to take up his regular work in the Forest Service. Before the report can be made public it must receive the formal approval of the Secretary of Agriculture. Immediately upon the return of the manuscript from Washington, I recommend that the report be published as a bulletin of the Division of Forestry. The report brings together all the local information now available about the genus Eucalyptus, and contains definite recommendations that together cannot but be of great value to tree planters in Hawaii.

FOREST PLANTING IN PROGRESS.

Under the contract made in March with Mr. C. G. Owen, tree-planting has been actively going on on Water Reserve C, of the Pupukea Homestead Tract. The trees have been shipped from the Government Nursery at Honolulu at the rate of 2000 per week.

Through an arrangement with the Federal Forest Service, a tract in Nuuanu Valley has been laid out for the experimental planting of Eucalypts, the cost to be borne from Federal funds. The actual planting of trees will commence in June; the ground is now being made ready.

Forest plating under the auspices of this Division is also about to be started on a portion of the Makawao Forest Reserve, Maui. The Maui Agricultural Company has agreed to replant an open area above Kailili in return for the right to remove dead trees now standing on the land which can be used for fuel. Preliminary arrangements have been completed and detailed plans are now in preparation. This planting also will consist mainly of Eucalypts. A number of different kinds will be planted in blocks of several acres each, so that as the groves grow they will be of no small value for purposes of comparison.

Trees for forest planting by corporations and individuals are constantly being sent out from the Government Nursery. Mr. Haughs' report for April enumerates some of the more important shipments made during that month.

PLANTING PLANS.

The making of planting plans for individuals and corporations and the giving of advice in regard to tree planting is one of the important lines of work of the Division of Forestry. In

response to a request from the Molokai Ranch Company (Mr. Geo. P. Cooke, Manager), I have recently spent some time on the Island of Molokai, going over the ground that the Ranch desires to plant, and discussing with Mr. Cooke the ways and means of doing the work required. A planting plan is now being drawn up for the Ranch, which will outline in detail the recommendations made.

FOREST RESERVES.

Following a public hearing by the Governor and the Board on April 30, in regard to the creation of a forest reserve above the Pupukea-Paumalu Homestead Tract on Oahu, the Governor, on May 10, signed a proclamation creating the Pupukea Forest Reserve, an area altogether of 865 acres.

A public hearing has been called for June 13, to consider the setting apart of a small reserve in Hamakua, Hawaii; a portion of the sea bluff on the land of Hauola. Reports and documents in regard to this project were submitted to and acted on by the Board during May.

During my recent visit to Molokai I was able to examine, on the ground in detail, the boundary of the proposed Molokai Forest Reserve. I expect to submit a report on this project with recommendations to the Board in the near future.

FOREST FENCE AT PUPUKEA.

Early in May a contract was let to fence the boundaries of the Pupukea Forest Reserve on Oahu. This work is now in progress.

BOTANICAL INVESTIGATION.

Mr. J. F. Rock, the Botanist of the Division of Forestry, spent the greater part of April on the Island of Molokai. He brought back much interesting material from the mountain forests, some rare Hawaiian plants being found only on that Island. At present Mr. Rock is on Hawaii, collecting on the slopes of Mauna Kea and on the Kohala Mountain.

Very respectfully,

RALPH S. HOSMER,
Superintendent of Forestry.

May 24, 1910.

Board of Agriculture and Forestry, Honolulu, Hawaii:

Gentlemen:—I have the honor to submit the following report of the work of the Division of Forestry for the past month:

PLANTING PLAN FOR MOLOKAI RANCH.

Based on the study made on the ground during a trip to Molokai in May, I personally have spent some time this month in preparing a comprehensive report outlining a general scheme for forest planting on the lands owned by the Molokai Ranch Company. This work was done at the request of the Ranch Company under the standing offer of assistance to tree planters made by the Division of Forestry. It is expected that the Ranch Company will begin actual work in tree-planting next winter.

DISTRIBUTION OF TREES.

Owing to a setback in the growth of the seedlings, due to a spell of wet weather some weeks ago, the shipment of trees for planting of Water Reserve C, at Pupukea, has been temporarily discontinued. Some 10,000 trees are being got ready for this place, however, and will be sent down at the end of this month. During May and the first part of June several shipments of seedlings were made from the Government Nursery to various persons and corporations; in all about 27,000 trees have been sent out since May 1, 1910. Mr. Haughs' reports give the details of this matter.

In this connection I would call attention to the fact that delay can be avoided in obtaining trees from the Government Nursery if persons or corporations desiring to obtain seedlings will submit a memorandum of what they want a few months prior to the date the trees are desired. As seedlings in the Nursery keep on growing and soon get to a size too large to be successfully handled, it is impracticable to keep large numbers constantly on hand. It takes from two to four months to grow most of the Eucalyptus from seed to a size suitable for planting. The Division of Forestry is delighted to grow all that are wanted, but the members of the staff would decidedly appreciate having advance notice of probable demands.

A NEW FOREST RESERVE.

Following a public hearing on June 13, Acting Governor Mott-Smith on the same day signed a proclamation creating a small forest reserve in the District of Hamakua, Island of Hawaii, a portion of the government land of Hauola, some seven acres, on the edge of the bluff above the sea. The object of this little reserve, which is called the Hauola Forest Reserve, is to make possible better care than could otherwise be given to a shelter belt of Ironwood trees that protects the good agricultural land behind.

During the past month considerable progress has been made on several other forest reserve projects. These will be brought before the Board at an early date.

FOREST FENCE AT PUPUKEA.

One of the forest fences at Pupukea—that on the Waimea boundary—has now been completed and the other is in process of construction. During the month I have made two inspection trips to Pupukea in connection with this work.

• BOTANICAL EXPLORATION.

Since May 13, Mr. J. F. Rock, the Botanist of the Division of Forestry, has been in the Kohala District on the Island of Hawaii collecting herbarium material in the native forest, weeds and other plants on the ranches, and gathering data in general in regard to plants now growing on the Islands. On the slopes of Mauna Kea, along the ditches on the windward side of the Kohala Mountain, and in the paddocks of the Parker Ranch he has got many valuable specimens. Mr. Rock expects to return to Honolulu at the end of June.

Very respectfully,

RALPH S. HOSMER,
Superintendent of Forestry.

June 20, 1910.

R. S. Hosmer, Esq., Superintendent of Forestry, Honolulu, Hawaii:

Dear Sir:—The following report gives the principal work done during the month of April:

NURSERY.

Mr. Gerrit P. Wilder is sending large quantities of seeds and plants from the different countries which he is visiting. We have already received consignments from Manila, Calcutta, Singapore, and Ceylon. Two wardian cases and one box of plants were received from Mr. Wilder from Singapore. The plants are being taken care of and the seed propagated in our propagating houses.

Other work done at the nursery has been packing up and shipping plants, transplanting seedlings, etc.

Plants distributed during the month:

	In seed boxes.	Transplanted in boxes.	Pot-grown
Sold	16,000	450	1,464
Gratis	9,300	5,038	4,421
	<hr/> 25,300	<hr/> 5,488	<hr/> 5,885

Total, 36,673.

8,000 of the above plants were sent to Mr. C. G. Owen to be planted on Reserve "C," Pupukea-Paumalu Homesteads, as follows:

- 4,000 *Eucalyptus robusta* transplanted in boxes;
- 3,063 of same species pot-grown;
- 637 *Cryptomeria japonica*;
- 111 *Cupressus macrocarpa* transplanted in boxes;
- 189 pot-grown.

Ten thousand ironwood plants (*Casuarina equisetifolia*) in seed boxes were sent to Makaweli plantation, Kauai. Owing to careless handling by the steamship people five boxes of the seedlings, approximately 5,000 plants, were practically destroyed. Manager Baldwin stated in his letter that five of the boxes were very much damaged owing to the soil being loosened and the trees mixed up every which way. The loss will be made good by us without cost to the plantation. Five more boxes will be shipped next week.

SEED COLLECTING.

The two seed boys have been collecting seed in the city. The seed collected being principally *Casuarina equisetifolia*, *C. quadrialis*, also the different *Cassias*. The seeding season for the *Grevillea robusta* will be on soon and will take up much of the time of the collectors as it is rather difficult to gather.

EXPERIMENT GARDEN, MAKIKI.

The everblooming bougainvillea vines ordered by Mr. Marston Campbell have been planted on the two knolls at the lower end of Heron Valley, close by the line of the new Tantalus road. The number of vines planted being 410. A large number of cuttings of the different shades of Bougainvillea have been planted at the nursery and Makiki garden; these will be ready in about four months. We are indebted to Mr. Ralph G. E. Forster, British Consul, for cuttings of the red variety; to Mr. John Cummings, Ahipuu, for cuttings of the light brick variety, and to Mrs. Chas. McCarthy and others for cuttings of the everblooming purple.

We have received from Mr. J. E. Higgins of the U. S. Experiment Station seven varieties of the Rattan palm (*Daemonorops*) which will be planted at the Makiki garden.

NUUANU STATION.

The man at the Station has been doing the regular routine work, clearing away vines from the trees, etc.

Respectfully submitted,

DAVID HAUGHS,

Forest Nurseryman.

Honolulu, April 30, 1910.

DIVISION OF ENTOMOLOGY.

Honolulu, Hawaii, May 1, 1910.

Honorable Board of Commissioners of Agriculture and Forestry,
Honolulu.

Gentlemen:—I respectfully submit my report of the work of the Division of Entomology for the month of April.

Of 33 vessels boarded we found fruit, plants and vegetables on 21. The usual care was taken in the rigid inspection with the following results:

<i>Disposal with principal causes.</i>	<i>Lots.</i>	<i>Parcels.</i>
Passed as free from pests.....	700	15,345
Fumigated before releasing.....	23	29
Burned	37	37
Dipped in Formaldehyde.....	1	1
Returned	1	1
Total	762	15,413

PESTS INTERCEPTED.

On a shipment of plants from Fiji we found a plant infested with mealy bug *Pseudococcus citri*. In bamboo stems from the Orient and in packing material from same locality two species of ants were found. In seeds from East Indies we found some larvae of a weevil. We also found tree seeds from the States infested with weevils. A box of limes from Acapulco, Mexico, came with the usual fruit shipments per Sierra. These were shipped by a San Francisco dealer and as they were infested with two species of scale insects and are on the prohibited list of fruits for the Territory we ordered them returned to shipper. A pomelo tree from Amoy, China, arrived without the usual U. S. Quarantine certificate and would have been destroyed under the ruling of that Department; however, as most of the material used in shipping was furnished by the U. S. Experiment Station here, the whole matter was left to the Division of Entomology with the request to thoroughly disinfect the package. This has been done and all soil and packing material destroyed and only the plant, which fortunately was free from pests, was turned over to the Experiment Station. As the fruit is known to be of very fine quality and much time and trouble had been taken to procure the tree we are glad that we were able to assist in the introduction of it.

As stated in my last report I was unable to submit Brother Matthias Newell's monthly report and I now append it for March and April.

In March six vessels were boarded on which were found 94 lots consisting of 1523 parcels. In April ten vessels were boarded

on which were found 87 lots consisting of 1465 parcels. One parcel of Palm seeds contained beetle larvae and all infested seeds were burned.

One colony of Cabbage worm parasites was liberated during the month. Owing to the small area of Cabbages now growing as well as to the reduction of the pest by fungi and other agencies we have had to stop breeding the new parasite for the present, as it is difficult to procure sufficient hosts for the work.

Very truly yours,

EDW. M. EHRHORN,
Superintendent of Entomology.

Honolulu, June 1, 1910.

Honorable Board of Commissioners of Agriculture and Forestry,
Honolulu.

Gentlemen:—I respectfully submit my report of the work of the Division of Entomology for the month of May.

Of 33 vessels boarded we found fruit, plants and vegetables on 20. The usual care was taken in the rigid inspection with the following results:

<i>Disposal with principal causes.</i>	<i>Lots.</i>	<i>Parcels.</i>
Passed as free from pests.....	511	9,942
Fumigated before releasing.....	7	7
Burned	39	64
Total	557	10,013

PESTS INTERCEPTED.

The most important find this month was a Leafroller on rose plants, which were also badly infested with the Rose-scale (*Aulacaspis rosae*) and Aphids. The shipment was found among the Japanese immigration baggage and was thrown into the furnace of the "Pioneer." We have serious trouble here already with leaf-rollers and this season especially our pests have been very abundant.

There arrived by Wells Fargo's Express a box containing two Chameleons sent as pets to a party here and as food the box contained a large number of larvae of the Flour beetle (*Tenebrio molitor*). A good strong colony of ants, the common house ant of the mainland, *Monomorium pharaonis*, had also found comfort among the lizards. The box and contents were destroyed, the Chameleons are now in alcohol in the Division Museum. Among our usual inspection of seeds we found some Jamaica seeds infested with Anthribid weevils.

The following is the work of the Inspector at Hilo: Six vessels arrived carrying vegetable matter consisting of 72 lots and 1134 parcels, which were passed as free from pests. Twenty-five sacks of potatoes were sorted over on account of potato scab. Four palm trees were fumigated before releasing them, being infested with scale insects.

On March 15th I sent a box containing a good strong colony of our Aphis eating ladybird *Coleophora inequalis* to Mr. E. K. Carnes, Superintendent of the California State Insectary at Sacramento, in reciprocation for his kindness in sending our Division large quantities of California ladybirds. I am pleased to report that the shipment arrived in very good condition and I have just sent a colony of another species *Platyomus lividigaster* to see how these would travel, my object being to coöperate with the California Board of Horticulture and in this way endeavor to procure such beneficial insects from them which will be of help to our plantings and in turn to send them such species which might prove of value to their large industry and in this way repay the Board for their kind coöperation.

Respectfully submitted.

EDW. M. EHRHORN,
Superintendent of Entomology.

HAUOLA FOREST RESERVE.

According to the usual custom of the Board there are published herewith the papers of the case in regard to the creation of a small forest reserve in the Hamakua District, Island of Hawaii. Following are the report of the Superintendent of Forestry, the minutes of the public hearing and the proclamation signed by Acting Governor Mott-Smith:

REPORT OF THE SUPERINTENDENT OF FORESTRY.

Honolulu, Hawaii, April 26, 1910.

Board of Commissioners of Agriculture and Forestry, Honolulu.

Gentlemen:—I have the honor to submit as follows a report with recommendations on the setting apart as a small forest reserve of a portion of the government land of Hauola in the District of Hamakua, Island of Hawaii:

The land in question is the narrow strip between the makai edge of the existing cane fields and the top of the bluff, approximately 3000 feet long by about 100 feet wide and containing an area of

seven acres, more or less. The land of Hauola is at present under lease to the Hamakua Mill Company. The lease expires May 18, 1914.

In view of the fact that experience has demonstrated the advisability in Hamakua of having a windbreak along the edge of the bluff to protect the cane, or indeed any crop that might be grown in the lower fields from the salt spray carried by the strong trade wind, the Hamakua Mill Company has proposed to the Government that provided this strip is set apart as a forest reserve the Company will plant it with a windbreak of Ironwood trees (*Casuarina equisetifolia*) and care for the same during a period of twenty-one years; the trees to be planted in accordance with the directions of the Forestry Department; the Mill Company to have the right to any wood that may result from wood cutting, if in the judgment of the proper forest officials of the Territory, it should be found advisable to make thinnings or improvement cuttings in the planted belt. As a matter of fact provided the plantation is maintained as an efficient windbreak only a very small quantity of wood could at best be so realized. The Mill Company is ready to go ahead at once with the tree planting; indeed some trees have already been set out.

The land proposed to be reserved is in itself of but small value. By being planted with a windbreak it will increase the value of the area immediately mauka and this whether the land continues to be used for raising sugar cane or is planted with some other crop. The Mill Company naturally hopes to re-lease the land of Hauola, but in the event of the land being subdivided at the expiration of the present lease, the Company wishes to insure the continuance of the windbreak. If the area is set apart as a forest reserve now the planted forest can be efficiently cared for and protected. If it is not set apart there is nothing to prevent the destruction of the trees were the land later to be subdivided and opened up.

By agreeing to set apart this small tract as a forest reserve the Government gains the double advantage of having it planted free of cost with desirable trees, and of benefiting the sections lying next mauka. It seems to me that this proposition is decidedly one that the Government should accept. I therefore recommend that the Board approve the creation of this reserve and request the Governor to set apart the section described below as the Hauola Forest Reserve.

Following is a description of the area which in the judgment of the Government Survey Office is sufficient for the present purpose:

HAUOLA FOREST RESERVE, HAMAKUA, HAWAII.

All that piece of land lying along the sea bluff on the Government land of Hauola, District of Hamakua, Island of Hawaii,

bounded by the fence at the bottom of the present cane field, and being all the land below said fence; the said piece of land having a length of about 3000 feet and an average width of about 100 feet and comprising about seven acres, more or less; the exact area and description to be determined later and when so determined to be attached to and to form, in place of the present description, the official description of the Hauola Forest Reserve.

Area, 7 acres, more or less.

Very respectfully,

RALPH S. HOSMER,
Superintendent of Forestry.

Minutes of a Public Hearing in re the Proposed Hauola Forest Reserve, District of Hamakua, Island and County of Hawaii, Territory of Hawaii, held by the Acting Governor, Ernest A. Mott-Smith, and the Board of Commissioners of Agriculture and Forestry, in the Office of the Board on King Street, Monday, June 13, 1910, at 10:05 o'clock A. M.

Present:—Hon. Ernest A. Mott-Smith, Acting Governor of the Territory; Marston Campbell, President of the Board; Guilford H. Whitney, representing T. H. Davies & Company, and R. S. Hosmer, Superintendent of Forestry.

After consulting the map the Acting Governor asked the object of setting apart this stretch of land as a forest reserve.

Mr. Hosmer replied that the object of the creation of this small forest reserve on the Hamakua coast was to give permanent protection to a plantation of forest trees, mainly Ironwoods, which has been established by the Hamakua Mill Company as a windbreak to protect the section near the bluff from the strong trade winds. Mr. T. Clive Davies of T. H. Davies & Company has especially been interested in having this brought about. The land of Hauola is at present under lease to the Hamakua Mill Company, which lease expires in May, 1914. The windbreak will be efficiently cared for by the Mill Company and will protect the cane or any other crop that may be grown on the land immediately above it. The Hamakua Mill Company will plant the trees and care for the same during a period of twenty-one years. Whatever use may subsequently be made of the remainder of Hauola, benefit will result from having this windbreak.

The Acting Governor: The land as it now stands is valueless, is it not?

Mr. Hosmer: Yes, it is valueless.

Mr. Campbell: The easiest way to care for the land properly is to create it a forest reserve. When the lease expires the balance of the land may be homesteaded.

Mr. Hosmer: Of course, technically the reservation does not take effect until the existing lease runs out.

The Acting Governor: Are there any protests in writing or otherwise against the creation of this reserve?

Mr. Hosmer: There are none.

The Acting Governor to Mr. Guilford Whitney: I understand you represent the Hamakua Mill Company.

Mr. Whitney: Yes, through their agency, T. H. Davies & Company.

The Acting Governor: And that you appear in favor of the creation of the reserve.

Mr. Whitney: Yes.

The Acting Governor: I presume we shall have to fence this land.

Mr. Hosmer: I understand it is already fenced—the lower cane field fences protecting it.

Mr. Campbell: The question of fencing can be embodied in the agreement with the Hamakua Mill Company.

The Acting Governor: Are there any further matters to be brought up in connection with this reserve?

Mr. Campbell: May I suggest, that these seven acres of land be created a forest reserve, as there are no objections to setting this area apart, and that the proper form of official proclamation be prepared and signed by the Governor.

The Acting Governor: I will sign such a proclamation.

The hearing then adjourned.

PUPUKEA FOREST RESERVE.

Minutes of a public hearing in re the proposed Pupukea Forest Reserve, District of Koolauloa, Island of Oahu, held by the Governor and the Board of Commissioners of Agriculture and Forestry in the office of the Board on King street, Saturday, April 30, 1910, at 10 o'clock a. m.

Present—Hon. Walter F. Frear, Governor of the Territory; Marston Campbell, President and Executive Officer, Board of Agriculture and Forestry; R. S. Hosmer, Superintendent of Forestry; David Haughs, Forestry Nurseryman; Louis Margolin, Forest Examiner, United States Forest Service, San Francisco, California; Byron O. Clark, representing his son, Leslie Clark, a homesteader; E. K. Ellsworth and E. C. Winston, homesteaders.

Represented by proxy—President Campbell read proxies from C. J. Wheeler, H. G. Ginaca, Louis A. Ginaca, F. E. Haley, and O. T. Boardman; these gentlemen all being in favor of the creation of the reserves.

The meeting was called to order by the Governor.

President Campbell read the notice of the proposed Pupukea Forest Reserve Hearing, which was published in the Evening Bulletin of March 31 and the Hawaiian Star of the same date.

Various maps showing the four proposed reserves were displayed.

The Governor asked if there were any objections to this land being set aside.

Byron Clark stated that the fault he had to find was that the upper part of Pupukea is not included in this area; and also some arrangement should be made with the Railroad Company to extend the fence.

President Campbell: The petition received included all of the government lands.

The Governor: The upper part of Pupukea will be set aside as soon as one or two descriptions are completed. It was expected to have these descriptions completed last October, but they have been delayed.

The Governor: I would suggest that we proceed to the three water reserves.

Mr. Hosmer: The work of reforesting water reserves A, B, and C is well under way.

Byron Clark: I want to ask about the fence, as that is one of the requirements.

President Campbell: The Board of Agriculture and Forestry have advertised for bids and will proceed with the fencing as soon as the homesteaders have completed their work in this line. There is no object in going ahead until the fence is completed on the upper homestead lines.

Mr. Ellsworth: The fence around the lower portion of Reserve B is not on the boundary line, and this should be remedied.

The Governor: You would need a gate there, would you not?

Mr. Ellsworth: There is an excuse of a gate there now.

Byron Clark: In regard to the piping of water—I find that some of the people are ready to put up the money for the pipe-line.

The Governor: Is there not a spring on Reserve C?

Byron Clark: Yes, but the pipe line would have to cross Mr. Owen's place.

The Governor: How much of a flow is there?

Byron Clark: It varies according to conditions; probably 100 to 1500 gallons per day.

The Governor: Could not a reservoir be built on Reserve C?

Byron Clark: A reservoir built above the spring is just what we want to control this water in order to give everybody a share.

Mr. Ellsworth: By tapping the spring at its upper force, the pipe could be brought directly to Mr. Owen's line and from there

pumped to a distance of about 90 feet. We could put this matter up to Mr. Owen telling him that we are going to have water any way and ask him to let us come through his place.

President Campbell: This water is reserved for the purpose of domestic supply.

The Governor: I should suggest that you put in water works and that each of you be charged with the amount you use. Do you all have tanks and make use of the rain that falls there?

Messrs. Clark, Ellsworth and Winston: Oh, yes.

The Governor: What is the rainfall over there?

Byron Clark: On an average—40 inches.

The Governor: Does this vary much between the upper and lower lots?

Mr. Ellsworth: No, not much. I have a gauge at my house and my last month's measurements were 7.27". The rainfall is probably heavier at the springs than at my place, but does not vary more than four or five inches on the two elevations.

Byron Clark: I understand that the Railway Company is willing to erect a fence there.

President Campbell: The Railway Company made an arrangement with Mr. von Holt to pay for part of the fencing on the upper boundaries—that is—half of the expense of the fence—approximately \$750—to be borne by the Railway and the other half by the government.

Mr. Ellsworth: As Mr. F. E. Haley suggests in his letter—the homesteaders of Pupukea should have the right to go on the reserve and develop water for the use of the makai lands. We might be able to get water up there that would prove very valuable to such lands.

Mr. Winston: These makai lands are water bearing lands.

Mr. Ellsworth: In regard to the water reserve on Mr. Temple's place—Reserve B, I believe—what would be the disposition of that should one want to make use of it?

The Governor: There ought to be a pipe-line there. Private arrangements should be made for this or the right-of-way condemned. The settlers on the lower lands along the frontage might bring action to condemn the lands where there is no other means of getting to it.

Byron Clark: I think it is the hope to construct a reservoir on Reserve C, into which a sufficient supply of water can be pumped. Should Mr. Owen object, and we can get around him, we shall do so.

Mr. Ellsworth: It would cost about \$1200 to get the water we need. There are already eight homesteaders who have certified their willingness to follow this plan. If we succeed in getting the right-of-way it will cost each homesteader about \$100.

Mr. E. C. Winston: This expense is hard on the settlers at the present time, for they have no money.

President Campbell: I should suggest that you form a water

association, put your pipe-line through and then supply meters to record the quantity each man uses. The meters and their installation will not tax each person more than \$9.00. The water is there for the use of the homesteaders and they can easily control it themselves.

The Governor: Can you not get the existing canneries to establish a branch?

Mr. Ellsworth: An effort was made on the part of Mr. Dole to establish a cannery this season.

The Governor: How much of a cannery could you keep going there?

Mr. Ellsworth: Two thousand tons for this year's crop. Fifty thousand cases. Mr. Ginaca made his contract with them last fall—I think it was October—and since that time there has been a good deal of doubt as to the result.

Mr. Hosmer: I would suggest that since the greater portion of this land is on the Pupukea side, and as a shorter name is always desirable, we refer to these lands in future, not as the "Pupukea-Paumalu Forest Reserve" but drop the "Paumalu" and call the tract the Pupukea Forest Reserve.

The Governor: There is nothing to prevent changing the name as this is public land.

The Governor: I see no reason why we should not declare these four pieces of land forest reserves, and appropriate order of proclamation should be made.

The Commissioner of Public Lands may set them aside as forest reserves. The setting aside of these lands as forest reserves is more protection than if they were set aside as water reserves.

The hearing then adjourned.

PUBLIC LANDS DEPARTMENT.

Hon. Marston Campbell, Commissioner Public Lands, has reported to Hon. E. A. Mott-Smith, Secretary, Territory of Hawaii, the following dispositions of public lands during the month ending May 31, 1910:

General Lease—Date of sale, May 21, 1910; purchaser, Honokaa Sugar Co.; location, Kaao-Paalaea, Kau, Hawaii; area, 986 acres; term, 15 years; annual rental, \$3,811.

Cash Sales—Date of sale, May 2; purchaser, Robert Hind; location, Puuwaawaa, N. Kona, Hawaii; area, 4.16 acres; purchase price, \$251.

May 6, to the following named purchasers the lots at Waiohinu, Kau, Hawaii, of numbers, areas and prices as respectively stated:

Mrs. Maria Kekuia, Lot 1a, 1 acre, \$5.
 Martin Martinson, 2a, 1.18 acres, \$5.
 J. M. Kamikina, 3a, 1 acre, \$5.
 E. Keko, 4a, 1 acre, \$5.
 K. Kainoa Keanu, 5a, 0.98 acre, \$5.
 Geo. K. Kawaha, 6a, 1 acre, \$5.
 J. L. K. Kawaha, 7a, 1 acre, \$5.
 Mrs. Kaia Kawaha, 8a, 1 acre, \$5.
 Kualonoehu, 9a, 1 acre, \$5.
 Rose Pinao, 10a, 1 acre, \$5.
 Sam Keliwaale, 11a, 1 acre, \$5.
 Tom Martinson, 12a, 1 acre, \$5.
 Kealoha Kawelu, 13a, 1 acre, \$5.
 Mrs. Emma Hewitt, 14a, 1 acre, \$5.
 Haili Kawelu, 15a, 1 acre, \$5.
 Mrs. M. Bertelmann, 16a, 1 acre, \$5.
 Sarah H. Kauhane, 17a, 1 acre, \$5.
 Henry Martinson, 20a, 1 acre, \$5.
 W. H. Hayselden, 22a, 1 acre, \$5.
 Geo. C. Hewitt, 24a, 1 acre, \$5.
 Mrs. A. H. McCarthy, 25a, 1 acre, \$5.
 Keawe Kamakee, 27a, 0.97 acre, \$5.
 Mrs. Mary Ann, 28a, 1 acre, \$5.
 Awana Akana, 29a, 1 acre, \$5.
 Kainoa Kawelu, 30a, 1.31 acres, \$5.
 M. G. Ernesto, 35a, 1.72 acres, \$7.
 S. K. Kamali, 36a, 1.72 acres, \$7.
 Ellen Kamali, 37a, 1.72 acres, \$7.50.
 J. G. Ernesto, 40a, 1.72 acres, \$7.50.
 Holaniku Kahelena, 41a, 1.72 acres, \$7.50.
 D. N. Hanamaikai, 42a, 1.72 acres, \$7.50.
 Sam Pa, 46a, 1.72 acres, \$7.50.
 Nahoa, 47a, 1.72 acres, \$7.50.
 Kala Pilipo, 48a, 1.72 acres, \$7.50.

Certificate of Occupation.—No. of certificate, 67; occupier, Ben Patty; Lot. No. 20 and 20a; location, Kapaa, Kauai; area, 2.67 acres; date of certificate, May 21.

No. 68, Vivian Kauai, 36 and 52, Kapaa, Kauai, 2.50 acres, May 24.

REPORT ON RICE AND COTTON INVESTIGATIONS IN CHINA AND JAPAN.

BY F. G. KRAUSS.

(Continued from May issue.)

To make the data here presented more accessible, it has been arranged under the following headings:

1. Varieties of Rice and Their Improvement.
2. Diseases and Pests of Rice.
3. Fertilization Experiments.
4. Agricultural Practice.

I. Varieties of Rice and Their Improvement.

One of the main objects of the investigation in Japan was to study their varieties of rice at first-hand, and to secure, if possible, varieties better suited to Hawaiian conditions from cultural and consumers' standpoints. After traveling through the principal rice-growing sections and consulting rice specialists in several Experiment Stations, the following four varieties were determined upon as most likely to meet our requirements:

1. Miyako (都). Considered the best variety grown in Japan. Fairly early and a fair yielder; 100 clumps gave an average of sixteen fruiting culms per clump; shows inclination to lodge.

2. Benkei (辨度). A most promising new variety, considered of finest culinary quality. Bears heavy, compact panicles; yields well and matures rather early. Averages eighteen fruiting culms per clump. On the whole, this rice impressed me as one nearly ideal.

3. Omachi (雄町). The standard variety of Japan, and the rice principally exported to Hawaii. Good yielder; maturing somewhat late. Bearded, a type not liked by the Hawaiian grower, but so strongly recommended by the Experiment Stations that it was included.

4. Shinriki (神力). Another standard variety of more recent development than Omachi. A late variety; stands up well and produces twenty to thirty fruiting culms per clump. Considered by the writer one of the most promising varieties.

With the assistance of the Kyushu and Yamaguchi Stations, 100 pounds of select seed of each of these varieties was purchased for general distribution among Hawaiian planters. The seed is expected here by the transport due December 5th, and should arrive in ample time for spring planting.

In addition to securing the above stocks for general plant-



Buildings and Yards of the Central Experiment Station at Nishigahara, near Tokio.

ing, the Kinai and Yamaguchi Stations offered the privilege of selecting a number of individual breeding plants from among their pedigree plots. This collection, together with stocks secured subsequently, consists of about 150 varieties, and will be grown in comparative tests during the coming year.

Our hope of producing a rice acceptable to the large Japanese population of the Islands, which now imports \$750,000 of rice annually from Japan, would seem to rest upon some one or several of these varieties. It is intended to grow pedigree stocks from the selections which were thus secured and to develop superior strains as rapidly as possible, distributing them among the rice growers as soon as sufficient seed is available.

The rice breeding work conducted at the Kinai Branch Station seemed to the writer unique in its extent, thoroughness and achievement. With the view of establishing the identity of the numerous varieties of rice grown in Japan, and to clear the nomenclature, in 1901 a systematic collection of rice seed from all parts of the Empire was undertaken. Four thousand different lots of seed were collected. The plants grown from these various seed lots were studied and compared for a period of six years, and have finally been grouped under 660 more or less constant varieties or strains, which are believed to be sufficiently distinct to be classified.

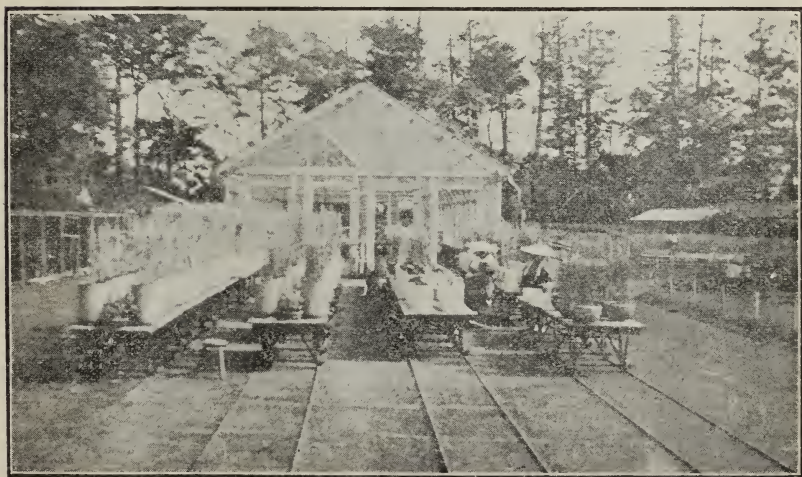
At the time of my visit pure strains of these rices were growing side by side in plots 12 x 32 feet, the whole experiment occupying ten acres and constituting model trial grounds. In addition to the extensive experiments just mentioned, there were 1,200 other field experiments of varying size, from those embracing only a few hybrid plants to plots a rod square, in which the plants were just reaching maturity. A half-dozen men were engaged in taking field notes, and each individual plant was considered separately.

The systematic arrangement of the experimental plots and the thoroughness with which the work was done was an object lesson deserving attention, and the writer personally got many valuable suggestions. In the breeding work, straight selection, by the "single-ear method," artificial crossing or hybridization, and mutations or sports, are made use of. In the season, which was then closing, fully 10,000 crosses had been made. Of these about thirty per cent. are usually successful. The hybridization is all done under glass. With the breeding project well worked out beforehand, the individual parents are planted in separate plots, and at the proper time hand-pollinated in the green-house. Three to five florets in each panicle are cross-pollinated, and are then covered with paraffine paper bags to prevent possibilities of accidental fertilization.

POT CULTURES AT KINAI BRANCH STATION, NEAR OSAKA, JAPAN.



Outdoor pot and plot cultures, principally devoted to breeding work for which the metal pots answer every purpose. Those shown in the illustration have been in use ten years and are still in first-class condition, showing their durability.



Glass house used to shelter breeding plants and other cultures during inclement weather. The pots are arranged on tracks which run on rails to facilitate handling.

The principles involved in Mendel's theory of heredity and in De Vries' mutation theory are well understood and are extensively applied in their breeding work. In applying Mendel's theory to rice hybrids, a large number of crosses have given results agreeing closely with those which Mendel and other workers in other crops have obtained. The practical application of these theories in breeding work is anticipated with greater assurance than ever, and already a number of valuable crosses have been effected. Plate C shows the parents and resultant cross of one of the most promising of these.

In extensive plantings of pure strains, exceptional opportunity is afforded for the study of mutations and this phase of research is not being neglected. It is interesting to note that during the season just past the most careful search of the entire fields, in which there were fully half a million plants, discovered less than one hundred mutations and natural hybrids, these variations doubtlessly including also some "rogues." This indicates two things: first, that mutations are extremely rare in the rice plant; and, second, that natural crossing is exceptional—a fact confirmed by the writer's experiments some years ago. The publication of this view, however, brought a good deal of criticism from some quarters.

Whenever a superior new variety is developed, or an old strain improved, seed of it is distributed among the Prefecture Demonstration Stations in the rice-growing sections, first where the plant is grown for at least two seasons. If promising, or at least superior to the rices already grown, the seed is distributed among the farmers for general cultivation. A number of the best varieties now growing in Japan were developed in this way, and their high quality is maintained by Government inspection. The whole system is an admirable one, worthy of adoption in Hawaii.

II. Insects and Fungus Diseases Affecting Rice.

Japan has a serious problem in the wide dissemination of the insect pests and fungus diseases of the rice plant.

Aside from the outbreak of the army-worm, *Heliophila unipuncta*, last year, Hawaiian rice has been singularly free from insect pests or fungus diseases. For this very reason it seems important to the writer that a warning should be sounded as to the danger there is to our rice industry in the Japanese pests. Since the time that certain imported Japan milled rice was refused landing at Honolulu, in 1907, the Rice Export Association of Japan has taken every possible precaution to prevent the exportation of infested grain, but far more serious than the grain pests are the insects and fungus diseases which affect the plant. The most serious of these are two lepidop-



RICE HYBRIDS PRODUCED AT KINAI CEREAL BREEDING STATION.

- A. Var., Omachi (female parent), tall growing, light tillering, inclined to lodge, blarled, but of fine quality grain. B. Var., Shiurik (male parent), dwarf, heavy tillering, heavy yielding, but quality of grain inferior to Omachi. 1-3. Hybrids resulting from above cross. Dominant features shown in hybrids, absence of beards and heavy tillering. Apparent improvement of quality of grain over male parent.

terous insects which bore in the stem, *Chilo simplex* Butl., and *Schaenobius bipunctifer* Walk. The former is double brooded, and many larvae will be found in a stem; the latter produces three broods a year, and the larvae will be found singly. It would seem that the danger of introducing these pests lies in the importation of rice straw used for packing. Fortunately they are parasitized in several stages. The most efficient natural enemy is the egg parasite, *Trichogramma japonicus* Ashm. Were it not for this and other parasites the losses from the borers alone would be very great; but even as it is, the writer is informed that in the worst infested regions fully fifty per cent. of the crop is sometimes lost. The borers are also controlled to some extent by burning infested plants when discovered. Such plants are easily distinguished by their pale color at or near maturity. After the crop is harvested the stubble must also be burned, as the insects pupate in or near the ground.

Other insect pests to which my attention was called were the leaf-hoppers—*Delphax furcifer* and *D. strictella*—which suck the plant juices; the rice weevil, *Calandra oryzae*, a Noctuid moth, *Nonagria inferens*; a butterfly, *Pamphila guttata*; and an aphid, *Schizoneura* sp. Two other leaf-hoppers, *Scotinophora vermiculata* and *Selenophalus cincticeps*, also affect rice, and the latter is supposed to be the means by which one of the fungus diseases is transmitted.

The following are some of the plant diseases affecting rice in Japan: 1. Stigomonose or dwarf disease (Japanese Oshiku-byo). This disease is supposed to be due to punctures made by the leaf-hopper, *Selenophalus cincticeps*. At certain seasons this insect is present in excessive numbers in the rice fields. As a measure of control, a thin layer of petroleum is spread over the flood water, and the insects are brushed into it and destroyed. To avoid injuring the rice, the oil is drained off immediately. 2. Brusone (Japanese Mochi-byo). A fungus disease causing spotting of the leaves. Often very destructive. The fungus is one of the Mucedinaceae, *Dactylaria parasitans* Cav. Remedial treatment consists of thorough tillage and the avoidance of excessive nitrogenous manuring. 3. Leaf-blight (Japanese Hagare-byo). Causes considerable damage to the crop in some years. The fungus is one of the Helminthosporiaceae, *Helminthosporium oryzae* Miyabe and Hori. The remedial measures are the same as those for brusone. 4. White leaf-blight (Japanese Shiro Hagaro-byo). Probably the most destructive disease of rice in Japan. The losses from it in a single prefecture have amounted to one million yen a year. The Japanese Government last year appropriated 3,000 yen for its study, and some promising results have been obtained from these investigations. It was found that the disease is always associated with an acid condition of the soil. A bacterium has recently been

isolated from the diseased plants, which is also found in acid soils. It is thought that the bacterium is intimately associated with the disease. The disease appears to lose its virulence in neutral or alkali soils.

In connection with this disease it may be interesting to note the painstaking methods of the Japanese scientist, Dr. S. Takaishi, Chemist of the Fukuoka Station, who studied this disease in its relation to the soil, discovered that it was always associated with an acid soil, the acidity being produced by excessive nitrogenous manuring. He also noticed that the diseased condition spread from the tip of the leaves downward, along the margins—the course followed by the dew deposited on the leaves when it was heavy enough to form into drops. Large quantities of dew, in some cases as much as a liter, were gathered and carefully examined chemically and bacteriologically. Finally the organism mentioned above was discovered. Pure cultures have been secured and further experiments are now under way.

Remedial measures for the control of the disease have consisted largely of neutralizing the soil and avoiding acid manures.

5. Rice Smuts. Two smuts do considerable damage to the rice—1, *Ustilaginoidea virens* (Cooke) Tak. (Japanese Ine-Koji), with very small spores; another, *Tilletia horrida* Tak. (Japanese Sumi-Kurobo), with larger spores. Nothing is done to control these diseases except the treating of the seed by dipping in water at 130 degrees F., for five minutes.

The above are only the more serious diseases of rice in Japan. Seventy-six distinct diseases have been recognized and described.

The introduction of any of these destructive plant diseases is perhaps more to be feared than the introduction of insect pests, and it should be a matter of serious concern to our quarantine officers.

The writer had abundant opportunity to study the disease in the field and in the laboratory; only lack of pathological training prevented him from going more fully into the subject. A great deal has been published on these subjects, but unfortunately most of it is in the Japanese language. Copies of the more important bulletins were provided, and are submitted herewith. A reference was given to a paper entitled "Studies of the Parasitic Fungi of Rice in Japan," by I. Miyake, Bot. Mag. of Japan (Tokyo), Vol. 23, March and April, 1909; but I was unable to secure copies.

(To be continued.)

**PROCLAMATION OF FOREST RESERVE IN THE DISTRICT OF
HAMAKUA, ISLAND AND COUNTY OF HAWAII,
TERRITORY OF HAWAII.**

Under and by virtue of the authority vested in me by the provisions of Chapter 28 of the Revised Laws of the Territory of Hawaii, as amended by Act 65 of the Session Laws of 1905, and by Act 4 of the Session Laws of 1907, and of every other power me hereunto enabling, I, Ernest A. Mott-Smith, Acting Governor of Hawaii, with the approval of a majority of the Board of Commissioners of Agriculture and Forestry, having held the hearing of which notice has been duly given as in said acts provided, do hereby set apart as a Forest Reserve, to be called the "Hauola Forest Reserve" that portion of the government land of Hauola in the District of Hamakua, Island of Hawaii, Territory of Hawaii, lying between the makai edge of the existing cane fields and the top of the bluff above the sea, and containing an area of approximately seven (7) acres; more particularly described on a map of the Island of Hawaii made by the Government Survey Department of the Territory of Hawaii, which said map is now on file in the said Survey Department marked "Government Survey Registered Map No. 2060" and a description numbered C. S. F. 2156, which said description, now on file in the said Survey Department, is as follows:

HAUOLA FOREST RESERVE, HAMAKUA, HAWAII.

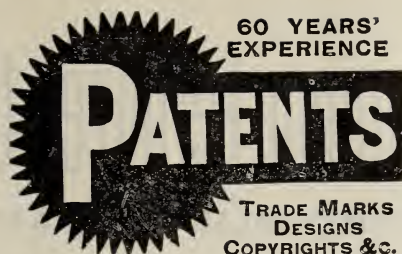
All that piece of land lying along the sea bluff on the Government land of Hauola, District of Hamakua, Island of Hawaii, bounded by the fence at the bottom of the present cane field, and being all the land below said fence; the said piece of land having a length of about 3000 feet and an average width of about 100 feet and comprising about seven acres, more or less; the exact area and description to be determined later, and when so determined to be attached to and to form, in place of the present description the official description of the Hauola Forest Reserve.

Area, 7 acres, more or less.

IN WITNESS WHEREOF, I have hereunto set my hand and caused the Great Seal of the Territory of Hawaii to be affixed.

Done at the Capitol in Honolulu, this 13th day
of June, A. D. 1910.

(Signed) E. A. MOTT-SMITH,
Acting Governor of Hawaii.



Anyone sending a sketch and description may quickly ascertain our opinion free whether an invention is probably patentable. Communications strictly confidential. **HANDBOOK** on Patents sent free. Oldest agency for securing patents. Patents taken through Munn & Co. receive special notice, without charge, in the

Scientific American.

A handsomely illustrated weekly. Largest circulation of any scientific journal. Terms, \$3 a year; four months, \$1. Sold by all newsdealers.

MUNN & Co. 361 Broadway, New York
Branch Office, 625 F St., Washington, D. C.

Garden and Farm Tools and Implements

To do good farming you must have up to date tools to work with. We carry a most complete line of everything needed by the small or large farmer, from the smallest hand trowel to the largest cane plow. We also have a good assortment of Hand, Bucket or Barrel Sprayers. Our assortment of Hoes, Shovels, Spades, Mattocks, Rakes, Garden Shears, Lawn Mowers, Garden Hose, and other things that are needed daily about the farm or garden, is most complete and our stock large.

E. O. HALL & SON, LTD.

Office: Brewer Building, Queen St.
Works Iwilei,

Telephone 430.
Telephone 272.

The Hawaiian Fertilizer Co., Ltd.

HONOLULU, HAWAII.

MANUFACTURE AND DEAL IN ALL KINDS OF
Fertilizer and Fertilizer Ingredients
INCLUDING :

Bone Meal,	Sulfate Ammonia,
Nitrate Soda,	Sulfate Potash,
Double-Superphosphate,	Dissolved Guano,
Ground Limestone, etc., etc.	

BOARD OF DIRECTORS :

Chas. M. Cooke, President,	E. F. Bishop, Treasurer,
E. D. Tenney, Vice-President,	J. Waterhouse, Secretary,
Geo. H. Robertson, Auditor,	
W. M. Alexander	
C. H. Atherton,	
E. F. Bishop, Managing Director.	
Norman Watins, General Superintendent	

The products of this company are equal in every respect to any fertilizers sold in any market. In none of the conditions are they ranked by those manufactured elsewhere.

We will be pleased to furnish analysis of the soil of any locality in the Territory and make special fertilizers for different soil products arranging the composition to suit conditions.

Prices and Terms on Application.

Board of Agriculture and Forestry.

PUBLICATIONS FOR DISTRIBUTION.

Any one or all of the publications listed below (except those marked *) will be sent to residents of this Territory, free, upon application to Mailing Clerk, P. O. Box 331, Honolulu.

BOARD.

- Report of the Commissioner of Agriculture and Forestry for 1900; 66 pp.
Report of the Commissioner of Agriculture and Forestry for 1902; 88 pp.
* First Report of the Board of Commissioners of Agriculture and Forestry, from July 1, 1903, to December 31, 1904; 170 pp.
Second Report of the Board of Commissioners of Agriculture and Forestry, for the year ending December 31, 1905; 240 pp.; 8 plates; 10 text figures.
Third Report of the Board of Commissioners of Agriculture and Forestry, for the year ending December 31, 1906; 212 pp.; 3 plates; 4 maps; 7 text figures.
Fourth Report of the Board of Commissioners of Agriculture and Forestry, for the calendar year ending December 31, 1907; 202 pp.; 7 plates.
Fifth Report of the Board of Commissioners of Agriculture and Forestry, for the calendar year ending December 31, 1908; 218 pp.; 34 plates.
"Notice to Importers," by H. E. Cooper; 4 pp.; 1903.
"Digest of the Statutes Relating to Importation, Soils, Plants, Fruits, Vegetables, etc., into the Territory of Hawaii." General Circular No. 1; 6 pp.
"Important Notice to Ship Owners, Fruit Importers and Others. Rules and Regulations Prohibiting the Introduction of Certain Pests and Animals into the Territory of Hawaii." General Circular No. 2; 3 pp.; 1904.
"Law and Regulations, Importation and Inspection of Honey Bees and Honey." General Circular No. 3; 7 pp.; 1908.
"The Hawaiian Forester and Agriculturist," a monthly magazine. Vols. I to VI; 1904-1909. To be obtained from the Hawaiian Gazette Co., Honolulu. Price \$1 a year.

DIVISION ON ENTOMOLOGY.

- "The Leaf-Hopper of the Sugar Cane," by R. C. L. Perkins. Bulletin No. 1; 38 pp.; 1903.
** "A Catalogue of the Hemipterous Family Aleyrodidae," by G. W. Kirkaldy, and "Aleyrodidae of Hawaii and Fiji with Descriptions of New Species," by Jacob Kotinsky. Bulletin No. 2; 102 pp.; 1 plate; 1907.
* "On Some Diseases of Cane Specially Considered in Relation to the Leaf-Hopper Pest and to the Stripping of Cane," by R. C. L. Perkins. Press Bulletin No. 1; 4 pp.; 1904.
"A Circular of Information," by Jacob Kotinsky. Circular No. 1; 8 pp.; 1905.
"The Japanese Beetle Fungus," by Jacob Kotinsky and B. M. Newell. Circular No. 2; 4 pp., cut; 1905.
Report of the Division of Entomology, for the year ending December 31, 1905. Reprint from Second Report of the Board; 68 pp.; 3 plates; 10 text figures.
Report of the Division of Entomology, for the year ending December 31, 1906. Reprint from Third Report of the Board; 25 pp.; 7 text figures.
Report of the Division of Entomology, for the year ending December 31, 1907. Reprint from Fourth Report of the Board; 18 pp.; 1 plate.
Report of the Division of Entomology, for the year ending December 31, 1908. Reprint from Fifth Report of the Board; 26 pp.; 2 plates.

DIVISION OF FORESTRY.

- * "Forest and Ornamental Tree Seed for Sale at Government Nursery." Press Bulletin No. 1; 3 pp.; 1905.
* "Suggestions in Regard to the Arbor Day Tree Planting Contest." Press Bulletin No. 2; 7 pp.; 1905.
"An Offer of Practical Assistance to Tree Planters." Circular No. 1; 6 pp.; 1905.
"Revised List of Forest and Ornamental Tree Seed for Sale at the Government Nursery." Press Bulletin No. 3; 4 pp.; 1906.
* "Instructions for Propagating and Planting Forest Trees." Press Bulletin No. 4; 4 pp.; 1906.
"Instructions for Planting Forest, Shade and Ornamental Trees." Press Bulletin No. 5; 7 pp.; 1909.
"Na Hoakaka no ke Kanu Ana i na Laau Malumalu ame na Laau Hoohiwahiwa." Press Bulletin No. 6; 8 pp.; 1909.
Report of the Division of Forestry, for the year ending December 31, 1905. Reprint from Second Report of the Board; 77 pp.; 5 plates.
* Report of the Division of Forestry, for the year ending December 31, 1906. Reprint from Third Report of the Board; 123 pp.; 4 maps.
Report of the Division of Forestry, for the year ending December 31, 1907. Reprint from Fourth Report of the Board; 70 pp.
Report of the Division of Forestry, for the year ending December 31, 1908. Reprint from Fifth Report of the Board; 85 pp.

** This Bulletin will be sent only to persons interested in the subject.

* Out of print.

Board of Agriculture and Forestry.

PUBLICATIONS FOR DISTRIBUTION—Continued.

DIVISION OF ANIMAL INDUSTRY.

- * "Inspection of Imported Live Stock." Rule 1; 1 p.; 1905.
- * "Inspection and Testing of Imported Live Stock for Glanders and Tuberculosis." Rule 2; 1 p.; 1905.
- "Concerning Glandered Horse Stock in the Territory." Rule 3; 1 p.; 1905.
- * "To Amend Rule 1, Inspection of Imported Live Stock." Rule 4; 1 p.; 1907.
- "Rules and Regulations, Inspection and Testing of Live Stock." Rules and Laws; 11 pp.; Revised; 1910.
- "Quarantine of Horse Stock from California." Rule 8; 1 p.; 1908.
- Report of the Division of Animal Industry, for the year ending December 31, 1905.
Reprint from Second Report of the Board; 62 pp.
- Report of the Division of Animal Industry, for the year ending December 31, 1906.
Reprint from Third Report of the Board; 41 pp.; 3 plates.
- Report of the Division of Animal Industry, for the year ending December 31, 1907.
Reprint from the Fourth Report of the Board; 104 pp.; 6 plates.
- Report of the Division of Animal Industry, for the year ending December 31, 1908.
Reprint from Fifth Report of the Board; 44 pp.

DIVISION OF FORESTRY.

FOREST AND ORNAMENTAL TREE SEED AND SEEDLINGS FOR SALE AT THE GOVERNMENT NURSERY.

The Division of Forestry keeps constantly on hand at the Government Nursery, seed and seedlings of the important native and introduced trees. These are sold at prices just covering the cost of collection or growing.

The list includes both forest and ornamental trees, such as Silk Oak, Koa, various species of Eucalyptus, Golden and Pink Showers, Pride of India, Poinciana, Albizzia, etc. The price of the seed varies from 10 to 50 cents per ounce. The seedlings may be had for 2½ cents each, except a few kinds which are 5 cents. Seed of the various palms is also for sale; the price per 100 varying from \$1.00 to \$2.50. All seed is tested before being sent out, which insures its being good.

All communications in regard to seed or trees should be addressed to David Haughs, Forest Nurseryman, Box 331, Honolulu, Hawaii.

RALPH S. HOSMER,
Superintendent of Forestry.

DIVISION OF ENTOMOLOGY.

To give information about insects free of charge is one of the duties of this Division and Hawaiian readers are hereby invited to make inquiry in person and by mail. In order to be able to advise intelligently or send the right kind of useful insects for relief we like and sometimes it is indispensable for us to see the insect suspected or caught in the act, also specimens of the injury. In a tin with a hole or two, or a wooden box specimens may be mailed at 3rd class rates. When specimens are not accompanied by letter *always* write your name and address in the upper left-hand corner of the package. Address all communications **SUPERINTENDENT DIVISION OF ENTOMOLOGY, P. O. BOX 331, HONOLULU, HAWAII.**

EDW. M. EHRHORN,
Superintendent.

VOL. VII

JULY, 1910

No. 7

Price, 10c. Per Copy; Per Annum, \$1.00; Foreign, \$1.25.

— THE —

Hawaiian Forester

AND

Agriculturist

A MONTHLY MAGAZINE

OF

Forestry, Entomology and Agriculture

ISSUED UNDER THE DIRECTION

OF THE

BOARD OF COMMISSIONERS OF AGRICULTURE
AND FORESTRY.

PUBLISHED MONTHLY.

Entered as second-class matter at the Post office, at Honolulu, Hawaifi.

ADDRESS ALL COMMUNICATIONS TO

DANIEL LOGAN,
EDITOR "THE FORESTER,"

P. O. BOX 366,
HONOLULU, H. T.

—:—
For business relating to advertising or subscriptions, address

HAWAIIAN GAZETTE Co., LTD., Publishers,
VON HOLT BLOCK, 65 S. KING ST., HONOLULU, HAWAII.

CONTENTS:

	PAGE.
Editorial.....	195
Farmers Ignorant of Loss	197
Rosella vs. Cranberry.....	198
Board of Agriculture and Forestry.....	199
Division of Forestry.....	205
Division of Entomology.....	207
Inoculation Against Hunger.....	209
Report on Rice and Cotton, etc., (Krauss).....	210

OFFICERS AND STAFF OF THE BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY.

COMMISSIONERS.

Marston Campbell, *President and Executive Officer.*
 J. M. Dowsett P. R. Isenberg
 H. M. von Holt Albert Waterhouse

DIVISION OF FORESTRY.

Ralph S. Hosmer, *Superintendent of Forestry and Chief Fire Warden.*
 David Haughs, *Forest Nurseryman.*
 Joseph F. Rock, *Botanical Assistant.*
 David Kapihe, *Forest Ranger for Tantalus.*

DIVISION OF ENTOMOLOGY.

Edward M. Ehrhorn, *Superintendent of Entomology and Chief Inspector.*
 Albert Koebele, *Consulting Entomologist.*
 H. O. Marsh, *Assistant Entomologist.*
 D. B. Kuhns, *Inspector.*
 Fred Muir, *Beneficial-Insect Collector.*
 Bro. M. Newell, *Fruit and Plant Inspector, Hilo, Hawaii.*
 Robert R. Elgin, }
 W. O. Aiken, } *Honorary Fruit* { *Mahukona, Hawaii.*
 W. D. McBryde, } *and Plant Inspector* { *Kahului, Maui.*
 Dr. W. B. Deas, } *at* { *Koloa, Kauai.*
 Wm. Robb, } { *Hana, Maui.*
 { *Lahaina, Maui.*

DIVISION OF ANIMAL INDUSTRY.

Victor A. Nörsgaard, *Superintendent of Animal Industry and Territorial Veterinarian.*
 L. N. Case, *Assistant Territorial Veterinarian.*
 John Vanhuizen, *Live Stock Inspector.*
 J. C. Fitzgerald, *Deputy Territorial Veterinarian for Maui.*
 H. B. Elliot, *Deputy Territorial Veterinarian for Hawaii.*
 A. R. Glazyer, *Deputy Territorial Veterinarian for Kauai.*

SECRETARY TO THE BOARD.

Miss Elsie M. Kuhn

CLERK AND STENOGRAPHER.

Miss Melika Peterson

EDITOR OF THE "FORESTER."

Daniel Logan

LIBRARIAN.

Miss Ella K. Dayton

THE HAWAIIAN FORESTER *and* AGRICULTURIST

VOL. VII

JULY, 1910

No. 7

BULLETIN ON FERTILIZERS.

Detailed suggestions on the best methods of fertilizing and the most profitable kinds of fertilizer constituents to apply on soils of different character, to cotton, corn, oats, wheat and cowpeas, are contained in Farmers' Bulletin No. 398 (Farm Practice in the Use of Commercial Fertilizers in the South Atlantic States), recently issued by the U. S. Department of Agriculture, and obtainable by application to the Secretary or to any Senator, Representative or Delegate in Congress.

Commercial fertilizers are expensive, and should be used only when needed, and then the deficiencies and requirements of the soil and of the crop must be a matter of accurate knowledge before they can be used with economical benefit. The character of the soil has a marked influence on the quantity and kind of fertilizer it is necessary to use in a good system of farming. And because a fertilizer is strikingly effective on one crop, upon a certain kind of soil, is not proof that the same combination will be at all beneficial to that crop on another kind of soil, and certainly not that its use with a different crop, upon another soil, will be economical. Yet the study of the author shows that this is too common a practice among a certain class of farmers. The formula suited to cotton on a red clay soil may need serious modifications for crops on sandy, sandy loam and gray loam soils, and for all crops other than cotton on red clay soil. Some farmers get twice as large yields as others, both located on similar soils, due to the fact that the former have a better understanding of the use of fertilizers and employ better farm methods.

The importance of taking into consideration all the factors which influence the use of fertilizers can not be too strongly emphasized. To properly adjust the required ingredients, the farmer must study his own farm conditions. No definite quantity or proportion of fertilizer constituents can ever be given that will meet the needs of a crop under all circumstances, as the rotation of crops, the growing of legumes, the use of crops for green manuring, the application of barnyard manure, the methods of prepara-

tion and cultivation, and the character of the soil will always be factors which must be taken into consideration when using commercial fertilizers.

A report of the Ceylon Agricultural Society in the Tropical Agriculturist (Colombo) for May says: "Some seed of the Algaroba or Mesquit bean (*Prosopis juliflora*) has been received from the Hawaiian Islands, but it is doubtful whether any will germinate, as they have been badly attacked by insects. The seeds were got out at the instance of a member, who thinks that the tree might be introduced into our dry areas and meet the difficulty of securing a supply of cattle fodder during the rainless months of the year."

Rudolph D. Anstead, a planting expert, writes as follows on information that dragon flies had been doing damage by eating the young tips of Hevea rubber tree shoots: "That dragon flies eat any part of a plant is an entirely erroneous idea. Their food consists of the small insects of which there are so many always flying about, and this is what they are after when they are seen hawking about all day. They occasionally settle on a twig for a rest, but when in this position are not feeding. That the Hevea shoots in question had been damaged is undeniable, but the damage was done probably by some form of aphid or blight, though this could not be found, and it is more than probable that the dragon flies were feeding on the blight. The larvae of the dragon fly are grub-like insects with large heads and formidable jaws, and are found in ponds and streams. These grubs feed voraciously on small water insects."

A historical and industrial number of the Mindanao Herald has been received. It makes a beautifully printed magazine of nearly a hundred pages three columns wide, "commemorating a decennium of American occupation of the land of the Farthest East and Nearest West." The number is on book paper and copiously illustrated in half tones. It gives a splendid insight of the prodigious resources of the Philippines and of their rapidly advancing development under American rule.

An agricultural school for pagan children is being established in the district of Davao, Island of Mindanao, Philippine Islands. C. R. Cameron, provincial superintendent of schools, has been working on the plan for some time. The school will be organized along military lines, the pupils to be uniformed and arranged in companies and squads, and the various activities timed to reveille, mess call, retreat, taps, etc. The purpose of the school

will be to teach its pupils practical agriculture as it is carried on in the Gulf of Davao, together with English, reading, writing and arithmetic, also the incidental trades such as carpentry, blacksmithing, etc., which experience has proved to be necessary for the successful operation of a plantation. Governor Pershing, on a recent visit to the district, the Mindanao Herald says, "investigated the project and is of the opinion that such a school will be a great civilizing influence among the wild people, and of much assistance to planters throughout the district."

Many applications for land have been received by the public lands board appointed under the amendments of the Organic Act made at last session of Congress. Land settlement will be the most commanding subject of government activity for some time to come, and the new policy is bound within a few years to make a great increase in diversified agricultural products.

FARMERS IGNORANT OF LOSS.

Ask any farmer how much each dollar he has received in returns cost him to produce. Ask him whether the expenditure of one dollar in capital and labor returned him \$1.10 or 90 cents.

He can't answer. The debit side of the ledger is void so far as he is concerned, and the part played in the production of an acre of corn by such items as rent of land, interest and depreciation of machinery, man labor and horse labor, has never entered into his calculation. If he should sit down and figure out his business in all the minutiae of detail that is necessary for the proper conduct of other business undertakings, mercantile or manufacturing, he might find that he was actually producing crops at a loss. A large percentage of American farmers, probably the majority of them, actually are producing foodstuffs at a loss, on the basis of the science of modern business.

Calculating on the basis of the original value of his land, the farmer is making money. Calculated on the current market price at which he could withdraw his investment and put it in interest-bearing industrial securities, he is losing money every time the seasons revolve. In many sections of the country farm values have doubled, even trebled in the last generation. Land that has been worked on the basis calculation of from \$5 to \$20 an acre must in the future respond to acreage values of from \$75 to \$200. The old generation with its obsolete methods, which has persisted solely on the excuse of cheap land, must give way before the new generation. The new-comer, the man who would establish himself as a farmer today, has to meet the changed conditions, and it is to these conditions that the business of farming must respond.

The question of fixed capital has come to stay. We are not yet out of our first generations as farmers on a grand scale. The first generation is taking its hand from the plow, and those who follow the pioneers, either through deed or sale or probate, must hereafter reckon interest on investments as an actual item of cost. Farming as an industry is in its transitional stage, and it is to meet the new conditions in a businesslike way that experts have been giving their attention to the question of devising a system of cost accounting for the farmer.—*The Bookkeeper*.

ROSELLA VS. CRANBERRY.

At the experimental gardens at Fort Brown experiments have been carried on with the rosella plant, which have proved a great success. The rosella plant promises to become a great rival of the cranberry. The plant was first introduced into Texas about two years ago from Jamaica by the Agricultural Department of the United States government, and since that time has proved very adaptable to the lower Rio Grande valley soil and climate. In the matter of taste the sauce of the rosella can hardly be told from the cranberry, and in some localities in south Texas many truck growers have supplied the local merchants who have been selling it in place of cranberries with practically the same degree of satisfaction to the trade. The rosella possesses the attractive trade advantage, however, of being two colors, red and white, and alongside of it may be growing a bush bearing red fruit. The product of the rosella plant is really not a fruit; it is the fleshy, acid cycles of the flowers that are used for making sauces, jellies and refreshing drinks.

It has been amply demonstrated at the gardens that these plants are easily grown here, and are well adapted to the soil and climate of the valley, and it is predicted by many that within a very few years it will be an extensive and profitable lower Rio Grande valley product. The average yield of the plant is twenty quarts to the plant, with an average price of five cents per quart. The rosella plant in some instances grows to a height of seven feet, and 800 to 1,000 of the plants can be grown on an acre, which requires considerably less cultivation and attention than many of the valley products.

In the experimental gardens at Fort Brown the seeds of the rosella plant were sown last June, and the harvesting of the fruit began in November.

On account of the climatic conditions of the valley, the rosella plant is more profitable there than in any other section of the state. The plant will bear from one to two months longer on account of absence of frost until late in the winter.—San Antonio Express.

BOARD OF AGRICULTURE AND FORESTRY.

A meeting of the Board of Commissioners of Agriculture and Forestry was held in the Board room, at the Capitol, on Wednesday, May 25, 1910, at 2 p. m.

Present—Marston Campbell, President and Executive Officer; Messrs. J. M. Dowsett and Albert Waterhouse, members; R. S. Hosmer, Superintendent of Forestry, and Dr. V. A. Nörsgaard, Territorial Veterinarian, by request.

FORESTRY.

President Campbell read communication of May 4, 1910, from T. Clive Davies, trustee for the fund, in which certain conditions are set forth subject to the disposal of the Kohala Forest Reserve contribution of \$24,280; also reply to same of May 19, stating that these conditions are entirely satisfactory and that this now places the matter where the Superintendent of Public Works may enter condemnation proceedings.

Mr. Dowsett stated that in regard to the construction of the storm ditches and reservoirs on this land, he understood the rights to the water were not entirely in the possession of the Woods Estate, the Woods Estate having leased to the Wight Estate the pastoral rights, the right to run their cattle there, which carry the right to water their stock. It is a very good thing to have the ditch go there for ranch purposes.

Mr. Campbell said he thought of making these people a tentative offer of \$7.50 an acre, which they will probably reject, and we can then come to a compromise. He is satisfied that not more than \$10 per acre need ever be paid for these lands.

Mr. Dowsett's suggestion was that we offer these people \$10 per acre less 25 per cent., and instruct Mr. Campbell to submit the matter to the trustees for the fund for their consideration of such a deduction. After Mr. Davies has been made fully familiar with the facts in the case he cannot object.

It was voted that the Superintendent of Public Works be instructed to secure all necessary information and that same be communicated to the trustees and that the Superintendent be further requested to take the required steps for the securing of these lands either by cash payment, compromise or condemnation proceedings.

The Superintendent of Forestry was instructed to secure description of the lands of Kehena III from the Territorial Survey Office, also transcript from the Registrar of Deeds.

Mr. Hosmer pointed out on the map where the present fences were and recommended that forest planting be started on a portion of the land of Puukapu, on a portion of the Waimea village. He said that Mr. A. W. Carter, on behalf of the Parker Ranch, had agreed to contribute an equal amount for forest planting on

this area, not to exceed, however, \$5,000, and if the Territory would put up \$5,000 there would be altogether \$10,000 to be expended for this purpose.

A discussion followed as to the details of this arrangement, it finally resulting in the request to the Superintendent of Forestry to take this matter up with Mr. Carter and report back to the Executive Officer.

It was then voted that the Board authorize the expenditure from the money set aside for the fencing and tree planting on the Kohala Mountain a sum not to exceed \$5,000 for tree planting above Waimea village, on condition that the Parker Ranch expend an equal amount in coöperation.

Mr. Hosmer submitted the manuscript of Mr. Louis Margolin's report together with a letter recommending its publication as a bulletin. No action was taken.

ANIMAL INDUSTRY.

It was voted that a salary of \$50 per month, beginning May 1, 1910, be allotted Dr. John C. Fitzgerald, the Deputy Territorial Veterinarian for the District of Maui.

MILK ORDINANCE.

The Board considered the Milk Ordinance and directed the Territorial Veterinarian to continue his work in the investigation of the prevalence of tuberculosis among the dairy cattle of Honolulu and vicinity with a view to obtaining data upon which to base regulations.

A meeting of the Board of Commissioners of Agriculture and Forestry was held in the Board room, at the Capitol, on Tuesday, June 7, 1910, at 2 p. m.

Present—Marston Campbell, President and Executive Officer; Messrs. J. M. Dowsett and Albert Waterhouse, members; Alexander Lindsay, Jr., Attorney General of Hawaii; Dr. V. A. Nörsgaard, Territorial Veterinarian, and Dr. R. Glaisyer, until recently a veterinary inspector of the U. S. Bureau of Animal Industry.

ANIMAL INDUSTRY.

A discussion followed regarding the Territorial Veterinarian's work of investigating the prevalence of tuberculosis among the dairy cattle in the Territory. Attorney General Lindsay stated the County had passed an ordinance that all cows must be kept clean; that the Board of Health had power to have removed all filth and sources of sickness, and that the Board of Agriculture and Forestry had the power to condemn and to destroy cattle, when in the opinion of the Territorial Veterinarian there is dan-

ger of the disease spreading and the health of other cattle being endangered.

Mr. Waterhouse stated that we must come to some decision with regard to the disposal of the cows which have reacted to the tuberculin test.

Dr. Nörsgaard said that Mr. Isenberg had the largest herd in town and that only twenty-eight per cent. of them had passed the test, and that, as a member of the Board, the action taken in his case will be a precedent for others to follow.

Mr. Waterhouse said the Board should require Mr. Isenberg to segregate his cows.

Mr. Campbell said that when Mr. Isenberg is made to understand the gravity of the situation he is sure the matter will go through, in the meantime the animals might be kept in quarantine.

Mr. Waterhouse said he thought a practical proposition was to make a more or less elastic ordinance which will cover, when necessary, all problematical situations, or those of a questionable character.

BRANDING OF COWS.

Mr. Campbell said that we must decide upon some method for the identification of clean cows.

Attorney General Lindsay stated that by the statutes the Board of Agriculture and Forestry has the right to make rules and regulations, which, of course, require the approval of the Governor.

Mr. Waterhouse said the latest idea of marking reactors was suggested by the Washington Department of Agriculture and that is the use of an official aluminum ear-tag on those that are clean. He expressed the belief that the Board would do well to send for a series of these tags.

Mr. Campbell said he thought there would be no difficulty in securing these tags, as Territorial Veterinarian Nörsgaard is a United States employee, representing them in the Territory of Hawaii.

Mr. Dowsett asked if there was any clause in the ordinance which prevented the sale of milk from reactors, if the milk is first pasteurized or sterilized.

Attorney General Lindsay submitted the Dairy Ordinance and stated that milk, being a food product, the Board of Health has the right to issue orders regarding the sale of it, and it is the duty of the Board of Agriculture and Forestry to see that all herds in the Territory are free from disease, that all diseased animals be destroyed and to prevent the spread of infection; that four months after license is secured a certificate of inspection must be produced by the owners of cattle showing that they are clean, free from tuberculosis or any other communicable disease.

Mr. Waterhouse asked Dr. Glaisyer what provision was made in the State of Utah, where he has been testing cattle for the State authorities, for the identification of animals that were tested and passed and those that reacted.

Dr. Glaisyer replied that brass tags were used for identification of the reacting animals and aluminum tags for those that passed the test; these were numbered consecutively and a description of each cow was taken in case she should lose that tag.

After further discussion it was moved and seconded that Dr. Nörsgaard be instructed to cable and arrange for the purchase of aluminum ear tags and everything necessary for their attachment and to design and have made official branding irons with which to mark the diseased animals. Carried.

A meeting of the Board of Commissioners of Agriculture and Forestry was held in the Board room, at the Capitol, on Thursday, June 23, 1910, at 9 a. m.

Present—Marston Campbell, president and executive officer; Messrs. J. M. Dowsett and Albert Waterhouse, members, and Superintendent of Forestry R. S. Hosmer.

FORESTRY.

Mr. Campbell reported that he had seen Mr. Davies and had learned that the representatives of the Woods Estate are satisfied to accept the offer of \$7.50 per acre which was made them for the forested portion of Kehena II.

In the matter of straightening the line of the Kohala Forest reserve above Waimea village, through a land exchange, Mr. A. W. Carter had not wanted to make the proposition as he was a member of the Land Board.

Mr. Campbell said that as nothing of this sort originates with the Land Board, there was no objection to the Board's acting on such a proposition. The matter will therefore be brought up to the Board by the Superintendent of Public Works.

Mr. Hosmer said that he had arranged to go over to Waimea on July 12, when he will take up matters in connection with this proposed exchange on the ground. The main object of the trip is the preparation of a planting plan for the area above Waimea village for which an allotment has already been made.

FENCING ON PIHA.

Mr. Campbell then read a letter from Mr. Hosmer under date of June 21, regarding a proposition from T. H. Davies & Company in which the Laupahoehoe Sugar Company requested coöperation of the government in certain forest fencing in the Hilo forest reserve.

Mr. Dowsett asked if the area in question near Laupahoehoe is government land and where the forest reserve line runs.

Mr. Hosmer answered that the Hilo forest reserve was one of the earlier ones to be set apart but that, in the absence of any one who could efficiently look after it, trespass from cattle had been continually going on. For a large part of the way the mauka boundary of the Hilo forest reserve follows the fence built by Mr. W. H. Shipman, across government and private lands. Mr. Shipman has been killing off the wild cattle below the fence, but at the west end of the reserve, above Laupahoehoe, the cattle nominally belonging to Mr. Meyers have had free run. The object of the present proposition is to restrict the cattle above Laupahoehoe to a relatively small fenced enclosure instead of letting them run throughout the entire forest.

Mr. Campbell said that Mr. Davies' proposition is made in entirely good faith. The condition as it exists today is that the government cannot keep Mr. Meyers off these lands, because there is no forest fence and no forest rangers. The plantation offers to corral the cattle and requests the government to assist in building the necessary fence. Mr. Campbell thought that the Board might well spend a few hundred dollars in building this fence.

Mr. Dowsett asked if the portion of the land of Maulua included in the forest reserve had not been condemned and the right of ownership given over to the government?

Mr. Hosmer said that nothing of that kind had been done and that, as a matter of fact, the action now proposed to be taken would do more for the protection of the forest than the government had been able or could now do unaided.

After further discussion in which it appeared to be the sense of the members that, if possible, the private land in this reserve ought to be turned over to the Board, it was voted that the matter be referred back to the Superintendent of Forestry for further conference with Davies & Company, pending action on their part of turning over to the Board the management of the land of Maulua, in which case the Board of Agriculture and Forestry will construct the necessary fence.

GATHERING OF AWA.

In the matter of granting rights to gather awa in one of the forest reserves on Maui, for which application had been made by a Hawaiian, a letter from Mr. Hosmer covering one from Mr. W. F. Pogue was read by Mr. Campbell, in which Mr. Hosmer recommended that free use permits be granted freely to individuals when the article to be obtained is to be used by that person, but that when the product is to be sold the Board should exact a fair price. It was voted that a general rule be adopted that awa and other forest products may be taken from the forest

in accordance with the long standing custom of the country, which is in part confirmed by a statutory amendment, but that when awa is taken it shall be required that two dozen slips are to be set out for each mature plant removed. It was further voted that no other rights than those to be obtained under such a permit be given to the applicant from Maui, Mr. J. K. Kapunihana.

UNRESERVED LANDS IN FOREST RESERVES.

Mr. Campbell read a report by the Superintendent of Forestry under date of June 22, relative to the deferred setting apart of certain forest lands in the Hilo, Kau and Hamakua-Pali forest reserves on Hawaii and the Ewa forest reserves on Oahu. These are lands which are included within these reserves, but, owing to the wording of the original forest law, have not been technically set apart. After discussion it was suggested that formal action be taken now by the Board and that the Governor be requested to issue the necessary proclamation. It was therefore voted that the Superintendent of Forestry be instructed to prepare the necessary papers to bring this matter to completion.

RESERVATION OF KAHOO LAWE.

The Superintendent of Forestry requested that the Board accept, as having been read by title, at this meeting, a report recommending the setting apart of the island of Kahoolawe as a forest reserve. This island is now under a lease which terminates in eighteen months. In its present condition it is an extreme example of soil waste through mismanagement. The island can only be reclaimed by being systematically cared for. The most effective way of reclaiming Kahoolawe is to turn it over to this Board as a forest reserve. This proposition is brought forward now at the suggestion and request of the Governor. Furthermore, as a secondary consideration, the reclothing of Kahoolawe with vegetation ought to throw some light on the interesting problem of the effect of a cover of vegetation in influencing rainfall.

Considerable general discussion followed in regard to Kahoolawe, after which it was moved that the matter be referred to the Committee on Forestry, which body is to report back to the Board at an early date.

PRINTING OF EUCALYPTS REPORT.

It was moved and seconded that the Superintendent of Forestry use every endeavor to have Louis Margolin's report on Hawaiian Eucalypts printed by the U. S. Department, and President Campbell requested that all correspondence in connection with this matter be referred to him as he intended taking this matter up with the Bureau in Washington.

ROUTINE REPORTS.

The regular monthly report of the Superintendent of Forestry and that of the Superintendent of Entomology were accepted.

On account of illness and pressure of work the Territorial Veterinarian was excused from making a regular report of the work of his division until next meeting of the Board.

RARE ISLAND BIRDS.

It was voted that the application of Miss Annie M. Alexander for a permit to collect twenty specimens of each rare species of Hawaiian Island birds be rejected in consideration of the fact that there are so very few of the birds remaining and the Museum here has specimens of all the birds for the purpose of scientific study. The secretary of the Board was instructed to write Miss Alexander, informing her to that effect.

ANIMAL INDUSTRY.

The President read a letter to C. Brewer & Company under date of May 21, from the Hutchinson Sugar Plantation Company at Naalehu, Kau, in regard to the withdrawal of the quarterly payments—their contribution—on account of the salary of Veterinary Surgeon Elliot; also letter from C. Brewer & Company of May 26, to the President of the Board under date of June 8, in regard to the same.

President Campbell had to report to the Board that these payments on account of salary will, however, continue.

DIVISION OF FORESTRY.

Board of Agriculture and Forestry, Honolulu, Hawaii.

Gentlemen:—I have the honor to submit the following report of the work of the Division of Forestry for the past month:

PLANTING PLAN FOR MOLOKAI RANCH.

Based on the study made on the ground during a trip to Molokai in May, I personally have spent some time this month in preparing a comprehensive report outlining a general scheme for forest planting on the lands owned by the Molokai Ranch Company. This work was done at the request of the Ranch Company under the standing offer of assistance to tree planters made by the Division of Forestry. It is expected that the Ranch Company will begin actual work in tree planting next winter.

DISTRIBUTION OF TREES.

Owing to a setback in the growth of the seedlings, due to a spell of wet weather some weeks ago, the shipment of trees for the planting of Water Reserve C, at Pupukea, has been temporarily discontinued. Some 10,000 trees are being got ready for this place, however, and will be sent down at the end of this month. During May and the first part of June several shipments of seedlings were made from the Government Nursery to various persons and corporations; in all about 27,000 trees have been sent out since May 1, 1910. Mr. Haughs' reports give the details of this matter.

In this connection I would call attention to the fact that delay can be avoided in obtaining trees from the Government Nursery if persons or corporations desiring to obtain seedlings will submit a memorandum of what they want a few months prior to the date the trees are desired. As seedlings in the nursery keep on growing and soon get to a size too large to be successfully handled, it is impracticable to keep large numbers constantly on hand. It takes from two to four months to grow most of the Eucalypts from seed to a size suitable for planting. The Division of Forestry is delighted to grow all that are wanted, but the members of the staff would decidedly appreciate having advance notice of probable demands.

A NEW FOREST RESERVE.

Following a public hearing on June 13, Acting Governor Mott-Smith on the same day signed a proclamation creating a small forest reserve in the District of Hamakua, Island of Hawaii, a portion of the government land of Hauola, some seven acres on the edge of the bluff above the sea. The object of this little reserve, which is called the Hauola Forest Reserve, is to make possible better care than could otherwise be given to a shelter belt of Ironwood trees that protects the good agricultural land behind.

During the past month considerable progress has been made on several other forest reserve projects. These will be brought before the Board at an early date.

FOREST FENCE AT PUPUKEA.

One of the forest fences at Pupukea—that on the Waimea boundary—has now been completed and the other is in process of construction. During the month I have made two inspection trips to Pupukea in connection with this work.

BOTANICAL EXPLORATION.

Since May 13, Mr. J. F. Rock, the Botanist of the Division of Forestry, has been in the Kohala District on the Island of Hawaii, collecting herbarium material in the native forest, weeds and other plants on the ranches, and gathering data in general in regard to plants now growing on the Islands. On the slopes of Mauna Kea, along the ditches on the windward side of the Kohala Mountain, and in the paddocks of the Parker Ranch he has got many valuable specimens. Mr. Rock expects to return to Honolulu at the end of June.

Very respectfully,

RALPH S. HOSMER,
Superintendent of Forestry.

June 20, 1910.

 DIVISION OF ENTOMOLOGY.

Honorable Board of Commissioners of Agriculture and Forestry,
Honolulu.

Gentlemen:—I respectfully submit my report of the work of the Division of Entomology for the month of June.

Of 32 vessels boarded we found fruit, plants and vegetables on 19. The usual care was taken in the rigid inspection and the following disposal made:

<i>Disposal with principal causes.</i>	<i>Lots.</i>	<i>Parcels.</i>
Passed as free from pests.....	915	14,328
Fumigated before releasing.....	8	16
Burned	11	11
Total inspected	934	14,355

PESTS INTERCEPTED.

In a small lot of ferns from New Zealand we found quite a number of caterpillars among the moss packing belonging to the Tinedas, the ferns were not eaten by the pest and we believe that the caterpillars were feeding on the moss and refuse of the shipment. A strong fumigation was given and all packing material carefully removed and destroyed.

Several lots of small palms from the Eastern States slightly infested with Scale insects (*Aspidiotus cyanophylli*) arrived by mail and were first fumigated before releasing.

In the baggage of the Chinese immigrants some sweet potatoes infested with the sweet potato borer, *Cylas formicarius*, were found and were destroyed. This pest is already well established in the Islands, but one never knows where the baggage is going and it is best to prevent the dissemination of the pest into new sections.

At the port of Hilo the following report of inspection was received:

Seven vessels were boarded and the total of 105 lots containing 1,080 parcels were examined. Nothing containing insect pests or fungi was found. In the future the inspector will give a more itemized account of the work, as it is most important to know just what fruits and vegetables are being shipped into the country. During the month Brother Newell paid the Division a visit and I had an opportunity to go over the work with him; he is very desirous of having me visit his district soon and I hope that I can manage to do so.

During the month Mr. George Compere, who has been collecting beneficial insects in the Philippines, passed through Honolulu on his way to California. I am pleased to state that I was able to give Mr. Compere some assistance in collecting food, mostly Mealy bugs and Cottony Cushion Scale as food for the various ladybirds he is taking to the Coast. Mr. Compere mentioned the existence of a parasite for the Alligator Pear scale, *Pseudococcus nipae*, at Manila and I shall communicate with the Department of Agriculture there and see to what extent the pest is kept in check and if arrangements can be made to procure the same.

Two sendings of parasites, *Pimpla behrensii*, have been received from Mr. J. P. Baumberger, who is collecting for our Division under my directions in California. We are in hopes that these parasites will help reduce the ravages of the Coconut leaf folder, *Omiodes blackburni* and other caterpillars infesting some of the truck crops of the Islands. The one species of *Pimpla* we have in the Islands is doing excellent work in the reduction of caterpillars and more species will naturally greatly add to the efficiency of the work of those already with us.

BENEFICIAL INSECTS DISTRIBUTED.

Captain Piltz of the "Florence Ward" called upon me during the month and stated that he feared the Hornfly *Haematobia serrata* was at Midway Island and wanted some parasites for the same. After making many inquiries about the flies observed by him and after consulting with Mr. B. W. Colley, the local agent, we are doubtful whether the Hornfly exist there. We, however, have been able to send parasites of the Stable fly, *Stomoxys calcitrans*, and the House fly, *Musca Domestica*, and have asked the agent to collect specimens of the various flies for our examination so that we shall definitely know what flies really exist on Midway

Island. Mr. F. W. Terry of the Hawaiian Sugar Planters' Association kindly coöperated with our Division in this matter and we shall continue our investigations until we can be assured that the flies are being reduced by the parasite, *Eucoila impatiens*.

During the month the following parasites and predaceous insects were liberated:

- 5 colonies of *Pimpla behrensii*,
- 7 colonies of *Novius cardinalis*,
- 1 colony of *Cryptolaemus montrouzieri*,
- 1 colony of *Scutellista cyanea*,
- 1 colony of *Eucoila impatiens* for Midway.

By consent of the President of the Board, your Superintendent has been able to procure the services of Mr. D. H. Marsh as Assistant Entomologist. The position of Inspector's Assistant will be vacant after August 1st, at which time Mr. Marsh will start upon his work.

Very truly yours,

EDW. M. EHRHORN,
Superintendent of Entomology.

Honolulu, July 1, 1910.

INOCULATION AGAINST HUNGER.

The new science of fertilizing ground for the farmer is described in the issue of *Harper's Weekly* for July 16th by Katharine Newbold Birdsall. How can the nitrogen in the air be brought down and made to enrich the soil? Certain plants, she says, have the property of absorbing this nitrogen, through the medium of millions of bacteria which gather the free nitrogen from the air. These are the clovers, pease, beans, peanuts, alfalfa, etc. The nodules which are formed on their roots by the bacteria contain millions of these beneficent germs, which can be cultivated in jelly, and distributed among farmers to be poured over seeds before planting at a cost of less than two dollars an acre.

REPORT ON RICE AND COTTON INVESTIGATIONS IN CHINA AND JAPAN.

BY F. G. KRAUSS.

(Continued from June issue.)

III. Fertilization Experiments.

Special inquiry was made as to the investigations on the fertilization of rice. The principal work along this line has been done at the Central Experiment Station at Nishigahara, and at the Imperial Agricultural College near Tokyo. I spent several days at the former institution, to familiarize myself as much as possible with their work and methods. The results obtained by them have largely been published, and as I was able to obtain most of the publications, the work is only briefly touched upon here, and a fairly complete bibliography of the published data is added to the end of this paper.

Probably no other line of research has been so fully developed in the colleges of agriculture and experiment stations of Japan as that of agricultural chemistry. The work follows the German school closely, and the influence of the teachings and work of Kellner, Loew and other German investigators in Japan is very evident in all their methods. The fact that more than half their work, published in foreign languages, appears in German gives further evidence of German influence. Many of the Japanese investigators have studied in Germany. Their references are largely to German works, and they speak that language more fluently than they do English.

Much of their fertilization experiments are made with pot cultures, after the Wagner method. So efficient did this method appear to the writer, that a careful study was made of it with the idea of introducing it in our own work. The officials of the Central Experiment Station presented a sample pot of the most approved form and on consultation with the Station chemist, it was decided to secure fifty pots from Japan. Thirty of these pots were received in time for our spring experiments and are now in use.

The following description of the pot (and accompanying photograph) may be helpful to others desiring to adopt this culture method. The pot is of high grade porcelain, glazed inside and outside. It is ten inches in diameter and twelve inches in height, inside measurement. A hole for drainage and separate hole for sub-irrigation are provided at the bottom. These openings are protected by porcelain guards, and the space in front and to an inch above, are filled with coarse gravel, coated with half an inch of clean quartz sand, to prevent the soil from filtering through.

Ten to twelve kilos of soil, representing approximately one fifty-thousandth acre foot, are used as the area unit, as this is approximately the area allotted to a clump of rice under field conditions. The soil is treated before it is put in the pot, the optimum moisture is supplied, and the rice seedlings are transplanted at the proper time. If it is intended to weigh the pots during the growth of the plant, the weight of all the pots is first made uniform by means of the gravel in the bottom. All experiments are carried on in triplicate, and the uniformity of growth observed by the writer in hundreds of such cultures would indicate that the average is affected only infinitesimally by individual discrepancies. The cultures are grown in the open and under glass, and the results obtained seem to be very satisfactory. A galvanized iron pot of the same dimensions as the porcelain one is also used and some of these have been in service for ten years. They are, however, not considered sufficiently reliable where acids constitute part of the fertilizer.

In addition to the above method, cultures are maintained in the field, in metal and earthen-ware cylinders which are sunk into the rice paddies. These cylinders are three feet in diameter and three feet in depth. Four inches are left projecting above the ground, and at a level with the ground surface there are several inch-wide holes to admit irrigation water when the paddy field is flooded. Five clumps of rice are transplanted to each of these cylinders. This method also gives very satisfactory results. An earlier, and somewhat cruder, method of growing cultures in the field was to sink a wooden frame three feet square into the paddy field, in which nine clumps of rice were planted. Better control and economy of space are the advantages claimed for this type of field cultures.

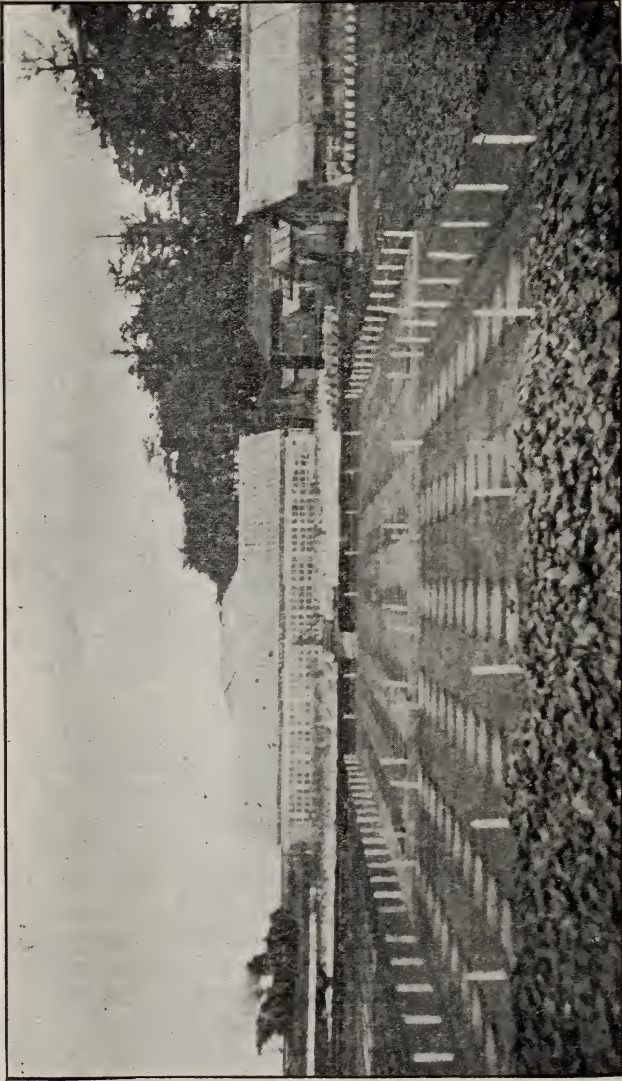
The accompanying photographs give some idea of the arrangement and extent of these cultures. Field plot experiments with fertilizers are maintained only for demonstration purposes, when the plots cover several square rods.

The adoption of pot and cylinder cultures in our work is strongly recommended for their accuracy and ease of use in carrying on a large number of experiments.

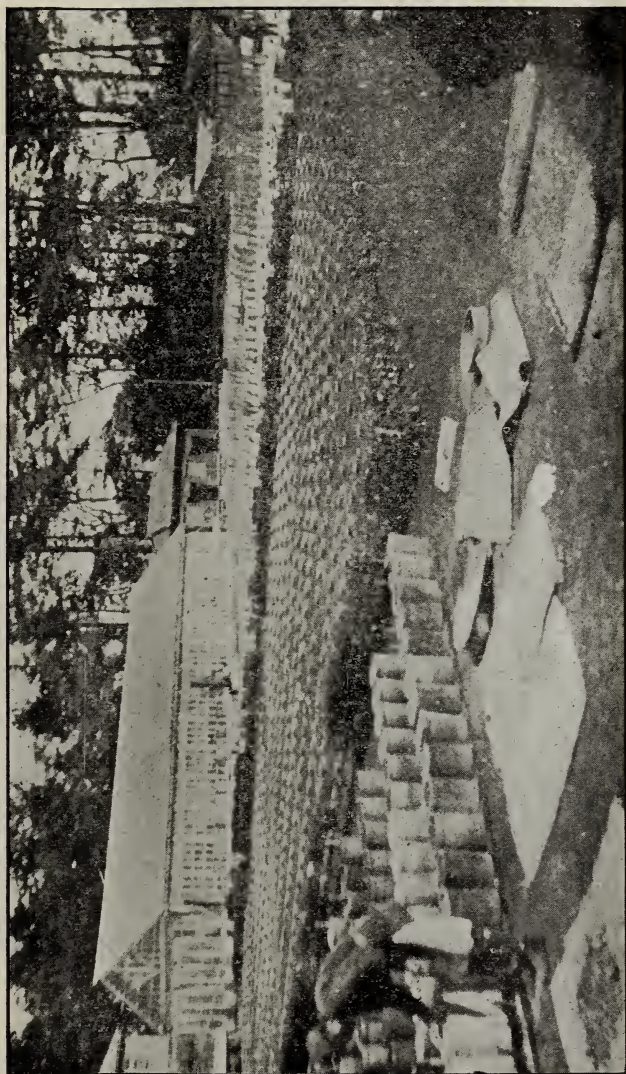
Beginning in 1889, Kellner and his associates conducted a series of experiments to determine the exhaustion of the nutrient material in the soil by successive croppings, and the amount of artificial fertilization necessary to maintain fertility. These experiments extended over a period of six years. A detailed report of them will be found in *Bulletins of the College of Agriculture*, Vol. I, 8-11, and Vol. III, pp. 371-406. All of these bulletins are now out of print, except Bulletin 11, which summarizes the first three years' work.

Taking the average of the results of a great many analyses, it was found that an ordinary crop, yielding 2,500 pounds of rice, removes from an acre of soil about 26 pounds of nitrogen, 16

OUT-DOOR PLANT FOR POT AND SUNKEN CYLINDER CULTURES, IMPERIAL CENTRAL AGRICULTURAL EXPERIMENT STATION, NISHIGAHARA, TOKYO, JAPAN.



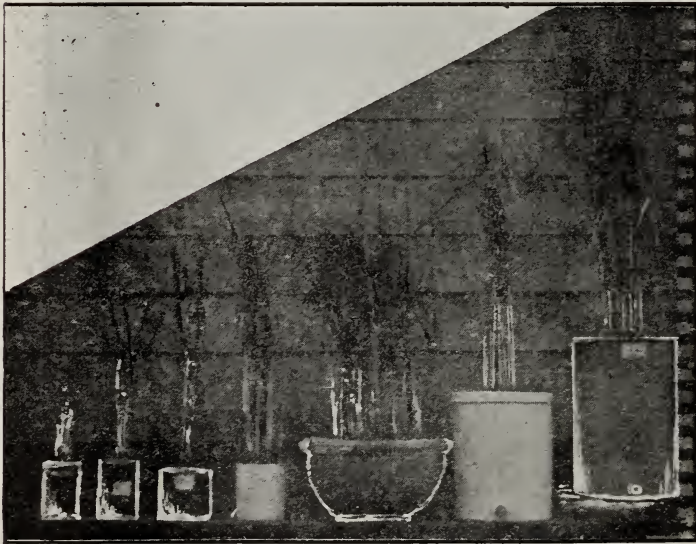
In foreground, sunken galvanized iron cylinders, used for fertilizer experiments with upland-cultures. Similar cylinders made of terra-cotta are sunken in paddy-fields for experiments with wet-land rice.



General view of pot and sunken cylinder cultures, together with glass house for indoor pot cultures. Several thousand such cultures are under way at this Station alone.

pounds of phosphoric acid and 28 pounds of potash. A good crop, yielding 4,000 pounds of grain, removes about 40 pounds of nitrogen, 25 pounds of phosphoric acid and 40 pounds of potash. The proportion removed by the grain and the straw respectively are also given. In these experiments the three essential elements were applied to the soil at the rate of about 90 pounds of each to the acre. The nitrogen was applied as ammonium sulphate, the phosphoric acid as double superphosphates, and the potash as potassium carbonate. The plants receiving the complete fertilizer yielded best; the next best yield came from the plants to which no potash was supplied; and the next best, from those to which no nitrogen was supplied. The poorest yields came from those which had no phosphoric acid. This indicated that the soils under consideration lacked phosphoric acid most, nitrogen to a less degree, and potash least of all. It also indicated that for the production of every 100 kilos of rice paddy

CULTURAL POTS USED BY THE JAPANESE AGRICULTURAL EXPERIMENT STATION.



Figs. 1 2 3 4 5 6 7

- Fig. 1. Glass cylinder about 4"x8" in size, used for sand cultures.
2. Glass cylinder about 3"x8" in size, used for water cultures.
3. Wire basket pots (after Whitney) about 4"x4", used for transpiration method of determining growth.
4. Porcelain beakers, about 5"x6", used for growing single seedlings to maturity, but considered too small for best results.
5. Improvised earthenware cultural pot, considered too shallow for best results, about 14"x9" in size.
6. One of the earlier type of 'Wagner' porcelain culture pots, 10"x12" in size.
7. Heavy galvanized iron culture pot of approved design, but not suited for use with fertilizers containing acid constituents.



FIG. 8.

Fig. 8. Most approved "Wagner" culture-pot. It is made of high-grade porcelain, glazed inside and out. Diameter 10", depth 12", inside measurement. It is provided with an "in-take" (1), and a drainage outlet (2).

2.53 kilos of ammoniacal nitrogen, 1.42 kilos of phosphoric acid, and 1.31 kilos of assimilable potash is necessary, assuming that at the beginning these constituents of the soil are entirely lacking.

The assimilation factor of ammonium sulphate was found to be, for nitrogen, 62%; of superphosphates, for phosphoric acid, 24%; and of potassium carbonate, for potash, 50%.

As in the stations investigations, nitrogen appeared to be the controlling factor in rice fertilization, it would be pertinent here to offer reasons for the results obtained in Japan. The important role of the nitrogenous manures in soil fertilization has long been recognized in Japan, and perhaps nowhere else are nitrogenous fertilizers used to such an extent as there. Heavy green-manuring and composting are the universal practice, and owing to it, rather than to the natural supply of nitrogen in the soil, (which otherwise must long ago have become exhausted) are due the results which have been mentioned.

The important point for us is this: After centuries of heavy cropping the paddy fields of Japan have each year become more fertile, especially so in the most essential and expensive nutrient material, nitrogen. Hawaiian rice lands, on the other hand, are becoming more and more impoverished each year, lacking particularly nitrogen. The writer believes that the only rational remedy is the adoption of the Japanese practice of adding humus and other nitrogenous matter to the soil in the form of green-manures, composts and other organic fertilizers, with crop rotation and the emergence of the soil for at least half the year, during which time the substitute crop would preferably be of such a nature to require inter-tillage throughout its growing season. Reference will be made later to rotation crops in Japan and their management.

While we have demonstrated the stimulating effects of ammonium sulphate it is questionable whether increased yields can be obtained continuously from this source alone. The Japanese investigators, with whom I conversed on the subject, seemed to doubt it. While as a matter of fact, they demonstrated early the greater efficiency of ammonium sulphate, as compared with sodium nitrate, calcium cyanide and other concentrated nitrogenous fertilizers, it has been found that an extensive and continuous use of these fertilizers results in an altered physical condition of the soil, which may be followed by serious deterioration of its mechanical and chemical construction. As we have repeatedly proved that sulphate of ammonia is more available than nitrate of soda in rice fertilization, the question arose as to the form in which nitrogen is assimilated by the rice plant in submerged cultures. Drs. Daikuhara and Imaseki, of the Central Experiment Station, who have been closely connected with the Japanese investigations, are thoroughly satisfied that the rice plant freely assimilates its nitrogen as ammonia. This was proved by the fact that the plants thrive in the presence of am-

monium nitrogen and the total absence of nitrate nitrogen. They seem to have proved that ammonium nitrogen and organic nitrogen cannot be converted into the nitrate form in submerged cultures; and further have they shown the general instability of nitrates in the submerged soil, due to reversion and loss by leaching, so that very little is available for plant nutrition in this supposedly essential form. It has also been found that more of the poisonous nitrites are formed in submerged lands than in dry lands. In a recent bulletin "On the Behavior of Nitrate in Paddy Soils," Buls. Imp. Cen. Exp. Sta., Vol. I, No. 2, the conclusions of the two investigators above mentioned are summarized as follows:

"(1) When nitrate is applied to the paddy soil it is reduced to some extent, first to nitrite, and then to ammonia and to elementary N, the loss of which varies according to the species of denitrifying organisms and the amount of soluble organic compounds present originally in the soil.

"(2) When nitrate is applied to the paddy soil, together with much organic matter in easily available form for microbes, such as glycerine, Na-acetate, starch, fresh oil cakes and straw, it is destroyed extensively by denitrification, the most part of its nitrogen being lost as free N, while only a certain portion of it remains in the soil, being partly assimilated by microbes and partly absorbed as ammonia by the soil or plants.

"(3) The question why nitrate is not a favorable manure for plants grown in paddy land can be answered as follows:

(a) *The loss of N by denitrification* is larger in paddy soil than in dry land.

(b) More of the *poisonous nitrites* are formed there than in dry land.¹

(c) *Loss of nitrate* takes place easily by the system of *irrigation*, practiced with paddy plants, being inevitable in the farmers' practice.

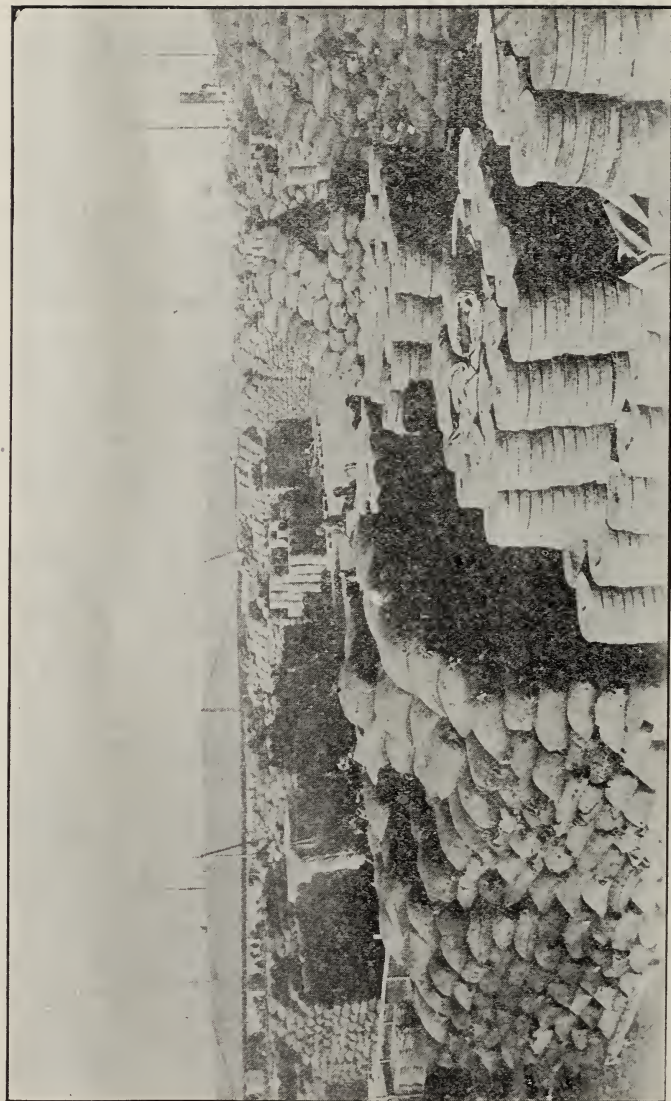
"(4) Dry land surface soil, when no organic manures are applied along with nitrate, does not favor denitrification nor nitrite-formation, while in the subsoil, reduction occurs to some extent. In very moist conditions, however, as in the rainy season, and especially when much organic manure is applied along with nitrate,² some denitrification takes place even in top-soil, and the reduction can proceed so energetically in the sub-soil that all the nitrate applied may be reduced within a few weeks.

"(5) Organic matters easily available to microbes favor denitrification to a large extent; further, straw or fresh rape cake

¹ Young rice plants placed in a potassium nitrite solution of 0.1% died after five days.

² According to Ampola, calcium nitrate is less attacked by denitrifying microbes than sodium or potassium nitrate, but in most soils calcium nitrate added will surely be changed by alkali-salts, and nitrates of sodium or potassium be formed.

OIL SEED CAKES EXTENSIVELY USED AS FERTILIZERS IN JAPANESE AGRICULTURE, ESPECIALLY IN RICE CULTURE.



Soy beans and soy bean cakes, the latter used as fertilizer and for stock feeding. While extensively grown in Japan, the bulk is imported from Manchuria.



Oil seed cakes used as fertilizers. They must contain the manufacturer's brand and are under government inspection.

1. Cotton seed cake, guaranteed analysis.—Total N. 6.0%; Total P₂ O₅ 2.0%
 2. Rape seed cake, guaranteed analysis.—Total N. 5.35%; Total P₂ O₅ 2.5%
 3. Soy bean seed cake, guaranteed analysis.—Total N. 6.50%; Total P₂ O₅ 1.5%
- (Samples at the Hawaii Station.)

have more influence upon the reduction of nitrate than the same materials well rotted, which agrees with former observations on stable manure."

While ammonium sulphate has usually been found to be very effective as a source of nitrogen in submerged rice culture, in acid soils it exerts a detrimental influence. The same has been found true of organic forms of nitrogen, especially those of a vegetable origin, as rape seed and soy bean cakes; those of animal origin, as dried blood, tankage, fish guanos, etc., much less so. When, however, such soils (which form fully 90% of Japan's paddy fields), are neutralized by liming, these fertilizers again exert their maximum power.

At the time of the visit to the Kyushu Station a series of pot and plot fertilization experiments were under way, which strikingly demonstrated these points. The soil under consideration was an acid granite soil, which, untreated, gave a poor yield. When treated with just enough lime to bring about a neutral condition, a fair crop was produced. When a complete manure was added in addition to the lime, whose constituents were all acid, i. e., a formula consisting of 5% nitrogen as sulphate of ammonia, 5% phosphoric acid as acid phosphate, and 5% potash as sulphate of potash, the yields were materially increased. But when the same fertilizer was applied to the unlimed soil a detrimental effect was noticeable. The same held true of sulphate of ammonia or organic materials of a vegetable origin used alone. When a complete fertilizer was made up of non-acid constituents, beneficial results were obtained, even when the soil had not previously been neutralized by liming.

From these and many other experiments, it has been concluded: 1. That many soils of reasonable fertility fail simply because of excessive acidity, and that this condition may be corrected by moderate liming. 2. Acid soils, instead of being benefited by fertilizers that are acid, are made worse. Fertilizers, rich in organic materials of animal origin, may prove beneficial on acid soils without liming, but liming greatly enhances their value. 3. Organic fertilizers of a vegetable origin are less suited to acid soils than are organic materials of animal origin.

It is interesting to note that the liming of paddy soils has been placed under government supervision in Kyushu because it was found that the indiscriminate use of lime tended to destroy the soil humus, and in other ways proved detrimental.

As much of the research in the chemical division is of a highly technical character, reference is made to the published data given in the bibliography.

(To be continued.)



Anyone sending a sketch and description may quickly ascertain our opinion free whether an invention is probably patentable. Communications strictly confidential. **HANDBOOK** on Patents sent free. Oldest agency for securing patents.

Patents taken through Munn & Co. receive special notice, without charge, in the

Scientific American.

A handsomely illustrated weekly. Largest circulation of any scientific journal. Terms, \$3 a year; four months, \$1. Sold by all newsdealers.

MUNN & Co. 361 Broadway, New York
Branch Office, 625 F St., Washington, D. C.

Garden and Farm Tools and Implements

To do good farming you must have up to date tools to work with. We carry a most complete line of everything needed by the small or large farmer, from the smallest hand trowel to the largest cane plow. We also have a good assortment of Hand, Bucket or Barrel Sprayers. Our assortment of Hoes, Shovels, Spades, Mattocks, Rakes, Garden Shears, Lawn Mowers, Garden Hose, and other things that are needed daily about the farm or garden, is most complete and our stock large.

E. O. HALL & SON, LTD.

Office: Brewer Building, Queen St.
Works Iwilei,

Telephone 430.
Telephone 272.

The Hawaiian Fertilizer Co., Ltd.

HONOLULU, HAWAII.

MANUFACTURE AND DEAL IN ALL KINDS OF
Fertilizer and Fertilizer Ingredients
INCLUDING :

Bone Meal,	Sulfate Ammonia,
Nitrate Soda,	Sulfate Potash,
Double-Superphosphate,	Dissolved Guano,
Ground Limestone, etc., etc.	

BOARD OF DIRECTORS :

Chas. M. Cooke, President,	E. F. Bishop, Treasurer,
E. D. Tenney, Vice-President,	J. Waterhouse, Secretary,
Geo. H. Robertson, Auditor,	
W. M. Alexander	
C. H. Atherton,	
E. F. Bishop, Managing Director,	
Norman Watins, General Superintendent	

The products of this company are equal in every respect to any fertilizers sold in any market. In none of the conditions are they ranked by those manufactured elsewhere.

i We will be pleased to furnish analysis of the soil of any locality in the Territory and make special fertilizers for different soil products arranging the composition to suit conditions.

Prices and Terms on Application.

Board of Agriculture and Forestry.

PUBLICATIONS FOR DISTRIBUTION.

Any one or all of the publications listed below (except those marked *) will be sent to residents of this Territory, free, upon application to Mailing Clerk, P. O. Box 331, Honolulu.

BOARD.

- Report of the Commissioner of Agriculture and Forestry for 1900; 66 pp.
Report of the Commissioner of Agriculture and Forestry for 1902; 88 pp.
* First Report of the Board of Commissioners of Agriculture and Forestry, from July 1, 1903, to December 31, 1904; 170 pp.
Second Report of the Board of Commissioners of Agriculture and Forestry, for the year ending December 31, 1905; 240 pp.; 8 plates; 10 text figures.
Third Report of the Board of Commissioners of Agriculture and Forestry, for the year ending December 31, 1906; 212 pp.; 3 plates; 4 maps; 7 text figures.
Fourth Report of the Board of Commissioners of Agriculture and Forestry, for the calendar year ending December 31, 1907; 202 pp.; 7 plates.
Fifth Report of the Board of Commissioners of Agriculture and Forestry, for the calendar year ending December 31, 1908; 218 pp.; 34 plates.
"Notice to Importers," by H. E. Cooper; 4 pp.; 1903.
"Digest of the Statutes Relating to Importation, Soils, Plants, Fruits, Vegetables, etc., into the Territory of Hawaii." General Circular No. 1; 6 pp.
"Important Notice to Ship Owners, Fruit Importers and Others. Rules and Regulations Prohibiting the Introduction of Certain Pests and Animals into the Territory of Hawaii." General Circular No. 2; 3 pp.; 1904.
"Law and Regulations, Importation and Inspection of Honey Bees and Honey." General Circular No. 3; 7 pp.; 1908.
"The Hawaiian Forester and Agriculturist," a monthly magazine. Vols. I to VI; 1904-1909. To be obtained from the Hawaiian Gazette Co., Honolulu. Price \$1 a year.

DIVISION ON ENTOMOLOGY.

- "The Leaf-Hopper of the Sugar Cane," by R. C. L. Perkins. Bulletin No. 1; 38 pp.; 1903.
** "A Catalogue of the Hemipterous Family Aleyrodidae," by G. W. Kirkaldy, and "Aleyrodidae of Hawaii and Fiji with Descriptions of New Species," by Jacob Kotinsky. Bulletin No. 2; 102 pp.; 1 plate; 1907.
* "On Some Diseases of Cane Specially Considered in Relation to the Leaf-Hopper Pest and to the Stripping of Cane," by R. C. L. Perkins. Press Bulletin No. 1; 4 pp.; 1904.
"A Circular of Information," by Jacob Kotinsky. Circular No. 1; 8 pp.; 1905.
"The Japanese Beetle Fungus," by Jacob Kotinsky and B. M. Newell. Circular No. 2; 4 pp., cut; 1905.
Report of the Division of Entomology, for the year ending December 31, 1905. Reprint from Second Report of the Board; 68 pp.; 3 plates; 10 text figures.
Report of the Division of Entomology, for the year ending December 31, 1906. Reprint from Third Report of the Board; 25 pp.; 7 text figures.
Report of the Division of Entomology, for the year ending December 31, 1907. Reprint from Fourth Report of the Board; 18 pp.; 1 plate.
Report of the Division of Entomology, for the year ending December 31, 1908. Reprint from Fifth Report of the Board; 26 pp.; 2 plates.

DIVISION OF FORESTRY.

- * "Forest and Ornamental Tree Seed for Sale at Government Nursery." Press Bulletin No. 1; 3 pp.; 1905.
* "Suggestions in Regard to the Arbor Day Tree Planting Contest." Press Bulletin No. 2; 7 pp.; 1905.
"An Offer of Practical Assistance to Tree Planters." Circular No. 1; 6 pp.; 1905.
"Revised List of Forest and Ornamental Tree Seed for Sale at the Government Nursery." Press Bulletin No. 3; 4 pp.; 1906.
* "Instructions for Propagating and Planting Forest Trees." Press Bulletin No. 4; 4 pp.; 1906.
"Instructions for Planting Forest, Shade and Ornamental Trees." Press Bulletin No. 5; 7 pp.; 1909.
"Na Hoakaka no ke Kanu Ana i na Laau Malumalu ame na Laau Hoohiwhiwa." Press Bulletin No. 6; 8 pp.; 1909.
Report of the Division of Forestry, for the year ending December 31, 1905. Reprint from Second Report of the Board; 77 pp.; 5 plates.
* Report of the Division of Forestry, for the year ending December 31, 1906. Reprint from Third Report of the Board; 123 pp.; 4 maps.
Report of the Division of Forestry, for the year ending December 31, 1907. Reprint from Fourth Report of the Board; 70 pp.
Report of the Division of Forestry, for the year ending December 31, 1908. Reprint from Fifth Report of the Board; 85 pp.

** This Bulletin will be sent only to persons interested in the subject.

* Out of print.

Board of Agriculture and Forestry.

PUBLICATIONS FOR DISTRIBUTION—Continued.

DIVISION OF ANIMAL INDUSTRY.

- * "Inspection of Imported Live Stock." Rule 1; 1 p.; 1905.
- * "Inspection and Testing of Imported Live Stock for Glanders and Tuberculosis." Rule 2; 1 p.; 1905.
- "Concerning Glandered Horse Stock in the Territory." Rule 3; 1 p.; 1905.
- * "To Amend Rule 1, Inspection of Imported Live Stock." Rule 4; 1 p.; 1907.
- "Rules and Regulations, Inspection and Testing of Live Stock." Rules and Laws; 11 pp.; Revised; 1910.
- "Quarantine of Horse Stock from California." Rule 8; 1 p.; 1908.
- Report of the Division of Animal Industry, for the year ending December 31, 1905.
Reprint from Second Report of the Board; 62 pp.
- Report of the Division of Animal Industry, for the year ending December 31, 1906.
Reprint from Third Report of the Board; 41 pp.; 3 plates.
- Report of the Division of Animal Industry, for the year ending December 31, 1907.
Reprint from the Fourth Report of the Board; 104 pp.; 6 plates.
- Report of the Division of Animal Industry, for the year ending December 31, 1908.
Reprint from Fifth Report of the Board; 44 pp.

DIVISION OF FORESTRY.

FOREST AND ORNAMENTAL TREE SEED AND SEEDLINGS FOR SALE AT THE GOVERNMENT NURSERY.

The Division of Forestry keeps constantly on hand at the Government Nursery, seed and seedlings of the important native and introduced trees. These are sold at prices just covering the cost of collection or growing.

The list includes both forest and ornamental trees, such as Silk Oak, Koa, various species of Eucalyptus, Golden and Pink Showers, Pride of India, Poinciana, Albizzia, etc. The price of the seed varies from 10 to 50 cents per ounce. The seedlings may be had for 2½ cents each, except a few kinds which are 5 cents. Seed of the various palms is also for sale; the price per 100 varying from \$1.00 to \$2.50. All seed is tested before being sent out, which insures its being good.

All communications in regard to seed or trees should be addressed to David Haughs, Forest Nurseryman, Box 331, Honolulu, Hawaii.

RALPH S. HOSMER,
Superintendent of Forestry.

DIVISION OF ENTOMOLOGY.

To give information about insects free of charge is one of the duties of this Division and Hawaiian readers are hereby invited to make inquiry in person and by mail. In order to be able to advise intelligently or send the right kind of useful insects for relief we like and sometimes it is indispensable for us to see the insect suspected or caught in the act, also specimens of the injury. In a tin with a hole or two, or a wooden box specimens may be mailed at 3rd class rates. When specimens are not accompanied by letter *always* write your name and address in the upper left-hand corner of the package. Address all communications SUPERINTENDENT DIVISION OF ENTOMOLOGY, P. O. BOX 331, HONOLULU, HAWAII.

EDW. M. EHRHORN,
Superintendent.

VOL. VII

AUGUST, 1910

No. 8

Price, 10c. Per Copy; Per Annum, \$1.00; Foreign, \$1.25.

THE
Hawaiian Forester
AND
Agriculturist

A MONTHLY MAGAZINE

OF

Forestry, Entomology and Agriculture

ISSUED UNDER THE DIRECTION

OF THE

BOARD OF COMMISSIONERS OF AGRICULTURE
AND FORESTRY.

PUBLISHED MONTHLY.

Entered as second-class matter at the Post office, at Honolulu, Hawaïi.

ADDRESS ALL COMMUNICATIONS TO

DANIEL LOGAN,

EDITOR "THE FORESTER,"

P. O. BOX 366,

HONOLULU, H. T.

For business relating to advertising or subscriptions, address

HAWAIIAN GAZETTE CO., LTD., Publishers,
VON HOLT BLOCK, 65 S. KING ST., HONOLULU, HAWAII.

CONTENTS:

	PAGE.
Editorial.....	221
Board of Agriculture and Forestry.....	225
Division of Forestry.....	227
Report on Rice, etc., (Krauss).....	231
The Jeque Manicoba Rubber Tree.....	238
Poultry Notes.....	240
Stock Notes.....	241

OFFICERS AND STAFF OF THE BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY.

COMMISSIONERS.

Marston Campbell, *President and Executive Officer.*
 J. M. Dowsett P. R. Isenberg
 H. M. von Holt Albert Waterhouse

DIVISION OF FORESTRY.

Ralph S. Hosmer, *Superintendent of Forestry and Chief Fire Warden.*
 David Haughs, *Forest Nurseryman.*
 Joseph F. Rock, *Botanical Assistant.*
 David Kapihe, *Forest Ranger for Tantalus.*

DIVISION OF ENTOMOLOGY.

Edward M. Ehrhorn, *Superintendent of Entomology and Chief Inspector.*
 Albert Koebele, *Consulting Entomologist.*
 H. O. Marsh, *Assistant Entomologist.*
 D. B. Kuhns, *Inspector.*
 Fred Muir, *Beneficial-Insect Collector.*
 Bro. M. Newell, *Fruit and Plant Inspector, Hilo, Hawaii.*
 Robert R. Elgin, }
 W. O. Aiken, } *Honorary Fruit* { *Mahukona, Hawaii.*
 W. D. McBryde, } *and Plant Inspector* { *Kahului, Maui.*
 Dr. W. B. Deas, } *at* { *Koloa, Kauai.*
 Wm. Robb, } { *Hana, Maui.*
 { *Lahaina, Maui.*

DIVISION OF ANIMAL INDUSTRY.

Victor A. Nörsgaard, *Superintendent of Animal Industry and Territorial Veterinarian.*
 L. N. Case, *Assistant Territorial Veterinarian.*
 John Vanhuizen, *Live Stock Inspector.*
 J. C. Fitzgerald, *Deputy Territorial Veterinarian for Maui.*
 H. B. Elliot, *Deputy Territorial Veterinarian for Hawaii.*
 A. R. Glaizyer, *Deputy Territorial Veterinarian for Kauai.*

SECRETARY TO THE BOARD.

Miss Elsie M. Kuhn

CLERK AND STENOGRAPHER.

Miss Melika Peterson

EDITOR OF THE "FORESTER."

Daniel Logan

LIBRARIAN.

Miss Ella K. Dayton

THE HAWAIIAN FORESTER *and* AGRICULTURIST

VOL. VII

AUGUST, 1910

No. 8

WATER INVESTIGATION.

An agreement was concluded early this month between the Federal and Territorial governments, under which they now coöperate in the investigation of the water resources of these islands. Much preliminary work had already been done this year, a staff of Federal hydrographers and topographers from Washington being paid out of the Territorial conservation fund. Some years ago a legal opinion was given from the Treasury Department to the effect that none of the money voted by Congress for this service could be expended in Hawaii. One of the amendments made to the Organic Act, at last session, enables the Territory of Hawaii to share in Federal appropriations for general purposes excepting where the words of the statute forbid. Hence, in the agreement just made, the United States and Hawaii will pay, half and half, \$10,000 for the water investigation for the fiscal year ending June 30, 1911. Mr. W. F. Martin, as district engineer, and Mr. C. H. Birdseye, topographer, whose services have hitherto been loaned to the Territory, now resume their regular places in the United States Geological Survey, but will direct the water investigation under the agreement mentioned. This water investigation will not only be of great advantage to lands already under cultivation, where either the rainfall or ground water supply is precarious, but will almost assuredly lead to the reclamation of areas of land now desert.

PAPER FROM BAMBOO.

Printers and publishers, as well as paper makers, have for years been troubled about the supply of paper. The question of raw material for making paper has been one of those most earnestly considered by the national forestry experts. It has been discussed this year by all the big associations connected with

printing and publishing. One orator recently denounced yellow journalism, not for its moral bane or its menace to the nation's peace, but for its voracity in eating up "the forest primeval" to furnish wood pulp for paper making. Often the newspapers and periodicals of Hawaii have discussed the possibility of finding raw material for paper-making in various products or by-products of the islands. Bamboo has probably been mentioned in this connection at various times. Just now bamboo paper manufacture is an object of large investments in the Orient. In view of the inviting paper situation in the United States and the world, the raising of bamboo for making into paper might well be a subject of practical investigation here. Some facts regarding the Oriental industry may excite the interest of local capitalists.

An exchange copies an article from the *Far Eastern Review* which tells about two considerable enterprises of the kind mentioned. One is that of the Tonkin Pulp and Paper Co., Ltd., with a capital of \$660,000 (Haiphong currency), organized by Hongkong and Indo-China capitalists for the purpose of establishing a factory and manufacturing paper from bamboo pulp. A concession of forty-three square miles of territory in Tonkin has been acquired and it is understood is capable of furnishing 50,000 tons annually. The other instance is contained in the statement that the manufacture of paper from bamboo pulp has been successfully demonstrated in Formosa, where the Mitsu Bishi Paper Mill Company is installing a plant with a capacity of about 300 tons of paper a month. The experiments were carried out at the scientific station at Kobe. According to a consular report this company has secured a concession of 8,000 acres of bamboo forest near Kagui. It is stated that for generations the Chinese have carried on this industry in their homes, but their methods are exceedingly primitive—no chemicals entering into their process. The Chinese use only bamboo shoots, for the evident reason that the shoots can be more readily worked up. "The new company," the account proceeds, "will use all kinds of bamboo, young and old, but particularly a variety called *kei chiku*, of which there is an unlimited quantity. The question of the supply of raw material will never puzzle the company, for the growth of bamboo is very rapid. It verily grows inches in a night." So far the experiments have been made by mixing bamboo pulp and wood pulp in varying proportions according to the quality of paper desired, but it is intended later to make paper entirely from bamboo pulp, the only difficulty standing in the way of this process now being that the cost of an entire bamboo paper is greater than that of a wood pulp paper. The pulp will be shipped to Japan in the form of roots or sheets, where it will be manufactured into two grades of paper—news and book.

What the *Far Eastern Review* says in conclusion is worthy of

more than passing interest in Hawaii, as it indicates what possibly might be an important addition to the new industries of these islands. It is this: "The success of this enterprise will serve to open up one of the most extensive industries in the Far East and make for a solution of the problem of maintaining an adequate supply of material to meet the increasing demand for paper throughout the world."

In the Philippine Agricultural Review for May the editor, G. E. Nesom, U. S. Director of Agriculture, gives "a chronological account of a trip investigating the sugar industry in Louisiana and the Hawaiian Islands," promising a separate report on all observations made by him on plantation organization and equipment, general management and sugar production. Mr. Nesom arrived here from San Francisco on December 27 and left on January 13. He visited plantations on Oahu, Maui and Hawaii, also the Honolulu Iron Works.

Manufacturing of nitrates from the air is being pursued on a large scale in Norway. Many millions of dollars have been laid out on plants and it is said that the works under construction at Notodden and Rjukan, when completed the end of this year, will absorb 240,000 horse-power and produce saltpeter of an export value of over \$5,000,000. In 1908 the value of nitrates produced in Norway was about \$560,000 and the expenses of production amounted to \$418,750.

A new development in the sugar world is a growing demand for Cuban sugars in Europe. Several cargoes have been shipped thither this year.

From both Cuba and the Philippines comes official information that indicates a decline of quality in the tobacco produced in both of those countries. Their respective agricultural authorities are urging greater care and improved methods in cultivation and curing.

As cotton is coming forward among Hawaii's new industries, it will be interesting to learn anything likely to enhance its profits. A process has been perfected in Germany to remove from the surface of cotton seed the linters, or fuzz, which may then be used in making the best rag papers. While a few years ago the cotton seed hulls had no value but the small one of fuel, by this invention a valuable by-product is obtained from the trash.

There may be some value for Hawaiian shippers of fresh pineapples in the following advice to growers in Natal, which is contained in a report on the export of citrus and other fruits from that country:

"Pineapples.—The best packing material has been found to be corn husks, which should above all things be dry. The fruit was shipped from the Cape in boxes of three sizes, the outside measurements of the middle one being $28\frac{1}{2} \times 13\frac{1}{2} \times 5\frac{1}{4}$ inches; there were three boxes in each bundle, and the top one only was lidded. It is suggested that, for the Cayenne pineapple, the box known as the Azores half case, which is 22 inches square and 9 inches deep, should be used. The box recommended for the Queen pine is one which will take ten and twelve fruits, according to size, allowing for sufficient packing. For pines of a good class, the boxes should be shipped singly and not bundled together in threes, two of which are not provided with lids, as this gives the fruit a 'cheap' appearance. During carriage at sea, ventilation appears to be better than cold storage."

Experiments are being made in cotton growing in Jamaica. At a recent meeting of the Jamaica Agricultural Society, the governor of the colony, referring to a statement by a member, Mr. Watson, that he had made a success of it for three years running, said he thought that Mr. Watson had advised the society not to encourage the small men to grow cotton. Mr. Watson admitted it was so, but explained that what he had said was "that they should wait until the bigger men made a success of growing cotton, then the small men would be more ready to follow." Pretty shrewd advice and it might be of benefit elsewhere than in Jamaica.

Has anyone in Hawaii ever heard of woolless sheep? At the meeting of the Jamaica Agricultural Society, mentioned in another paragraph, the secretary said he had made further inquiry as to when a troopship would be leaving West Africa for Jamaica, so that they might import some woolless sheep, etc.

Owing to the pressure of work in the Public Lands office, in connection with the opening of lands for homesteading to take place on and after October 19 as publicly advertised, the record of land transactions for the past two or three months has not been prepared for publication. The homestead opening is the greatest event in land administration in the Hawaiian Islands since the great land division in 1847, when feudal tenure gave way to private title to land. All the homestead lands that have been surveyed will be awarded, so far as applied for at the stated times, by lot to the applicants.

BOARD OF AGRICULTURE AND FORESTRY.

A meeting of the Board of Commissioners of Agriculture and Forestry was held in the Board room, at the Capitol, on Wednesday, July 20, 1910, at 10 o'clock a. m.

Present: Marston Campbell, President and Executive Officer, and Messrs. Albert Waterhouse and H. M. von Holt, members.

FORESTRY.

The regular monthly report of the Superintendent of Forestry and that of the Forestry Nurseryman were read and approved. The President instructed the Secretary of the Board to furnish the Press with a copy of each report for local notice.

The Forestry Nurseryman stated in his report that a small gooseneck dray for carting plants from Makiki and the nursery is required. It was moved and seconded that he be granted permission to purchase a truck and to dispose of the heavy wagon he has, in exchange. Carried.

President Campbell read the report of the Superintendent of Forestry, of June 22, 1910, in regard to several areas in forest reserves on the islands of Hawaii and Oahu that have not been formally set apart.

Motion was made by the President that the Board pass a resolution and cause to be prepared the necessary documents for the approval and signature of the Governor for proclamation and public hearing. This was seconded by Mr. von Holt and carried.

The Superintendent of Forestry also submitted a report dated June 23, proposing for consideration the setting apart of the entire Island of Kahoolawe as a forest reserve. From the long years of overstocking and cattle grazing this island has become desolate and a barren waste. If set apart as a forest reserve, its reclamation can more easily be undertaken. It is expected after the expiration of the existing lease, held by Mr. Eben P. Low, which runs out January 1, 1913, that steps can be taken toward its reclamation. An effort will be made to bring back a cover of vegetation. Before anything can be accomplished the livestock now on the island must be completely removed, in order that the vegetation may be given a chance.

President Campbell said the condition of the island is a most distressing one. The soil is heaped in little hummocks, and the sheep and goats paw the soil and root up the grass. At the expiration of this lease, in about eighteen months, Mr. Campbell stated that he, as Land Commissioner, would

refuse to consider a new lease and would make recommendation to the Land Board against the re-leasing of this land.

The President directed that a copy of Mr. Hosmer's report recommending the setting apart of Kahoolawe as a forest reserve be given to the Press for publication.

It was moved and seconded that the Superintendent of Forestry be instructed to prepare all necessary papers for the signature of the Governor, preliminary to the public hearing for the setting apart of this island as the Kahoolawe Forest Reserve. Carried.

The President read a communication under date of July 5, to the heirs of the estate of James Woods, in response to one from the heirs dated June 30. At a meeting of the heirs of the estate a resolution was recorded June 30, 1910, that the Secretary of the Woods Estate be instructed to notify the Board of Commissioners of Agriculture and Forestry that the heirs cannot entertain the offer of \$7.50 per acre for the lands of Kehena II, made by the Board, which resolution had been passed unanimously.

After some discussion it was moved and seconded that the Superintendent of Public Works be requested to institute condemnation proceedings for the land of Kehena II for forest reserve purposes. Carried.

The President read a letter from the Superintendent of Forestry to the Board, in regard to his report of June 21, submitted at a previous meeting, relative to the construction of a fence on the land of Piha, Hilo, Hawaii. It was voted that this report be placed on file.

RARE ISLAND BIRDS.

President Campbell read a communication dated July 5, to Miss Annie M. Alexander, expressing the Board's regret that at their last meeting it was deemed inadvisable to grant the permission she asked to collect specimens of the rare species of native island birds for exhibition purposes, as there are so few of these birds remaining.

PERMIT TO TUNNEL FOR WATER.

President Campbell also read a communication from Mr. Lee St. John Gilbert, dated June 21, 1910, an application for the right to tunnel for water in the Lualualei forest reservation, and stated that he had sent Mr. Martin, the hydrographer, to this reserve, who reported that there was little chance of Mr. Gilbert's getting water. Mr. Gilbert has bought a homestead there.

The Board expressed no objections to his going and prospecting for water. It was voted that such permission be granted him.

ENTOMOLOGY.

The regular monthly report of the Superintendent of Entomology was read and approved and a copy of the same given to the press with the request that it be published in full.

In his report, Mr. Ehrhorn expressed a desire soon to visit Brother Newell's district at Hilo. The President recommended that Mr. Ehrhorn be granted permission to visit the other islands at an early opportunity.

Mr. von Holt stated that this he considered a very good suggestion, as such a tour would put him in touch with the work that is being accomplished in this line by others. Permission was granted.

ANIMAL INDUSTRY.

Dr. Norgaard asked permission to attend the annual meeting of the State Veterinarian Medical Association to be held at San Francisco, September 6 to 10, 1910. Leave of absence was granted.

DIVISION OF FORESTRY.

Board of Agriculture and Forestry, Honolulu, Hawaii.

Gentlemen:—I have the honor to submit the following report of the work of the Division of Forestry for the past month:

PLANTING PLAN FOR MOLOKAI RANCH.

Based on the study made on the ground during a trip to Molokai in May, I personally have spent some time this month in preparing a comprehensive report outlining a general scheme for forest planting on the lands owned by the Molokai Ranch Company. This work was done at the request of the Ranch Company under the standing offer of assistance to tree planters made by the Division of Forestry. It is expected that the Ranch Company will begin actual work in tree planting next winter.

DISTRIBUTION OF TREES.

Owing to a setback in the growth of the seedlings, due to a spell of wet weather some weeks ago, the shipment of trees for the planting of Water Reserve C, at Pupukea, has been temporarily discontinued. Some 10,000 trees are being got

ready for this place, however, and will be sent down at the end of this month. During May and the first part of June several shipments of seedlings were made from the government nursery to various persons and corporations. In all about 27,000 trees have been set out since May 1, 1910. Mr. Haughs' reports give the details of this matter.

In this connection I would call attention to the fact that delay can be avoided in obtaining trees from the Government Nursery if persons or corporations desiring to obtain seedlings will submit a memorandum of what they want a few months prior to the date the trees are desired.

As seedlings in the nursery keep on growing and soon get to a size too large to be successfully handled, it is impracticable to keep large numbers constantly on hand. It takes from two to four months to grow most of the Eucalypts from seed to a size suitable for planting. The Division of Forestry is delighted to grow all that are wanted, but the members of the staff would decidedly appreciate having advance notice of probable demands.

A NEW FOREST RESERVE.

Following a public hearing on June 13, Acting Governor Mott-Smith on the same day signed a proclamation creating a small forest reserve in the District of Hamakua, Island of Hawaii, a portion of the government land of Hauola, some seven acres on the edge of the bluff above the sea. The object of this little reserve, which is called the Hauola Forest Reserve, is to make possible better care than could otherwise be given to a shelter belt of Ironwood trees that protects the good agricultural land behind.

During the past month considerable progress has been made on several other forest reserve projects. These will be brought before the Board at an early date.

FOREST FENCE AT PUPUKEA.

One of the forest fences at Pupukea—that on the Waimea boundary—has now been completed, and the other is in process of construction. During the month I have made two inspection trips to Pupukea in connection with this work.

BOTANICAL EXPLORATION.

Since May 13, Mr. J. F. Rock, the Botanist of the Division of Forestry, has been in the Kohala District on the Island of Hawaii, collecting herbarium material in the native forest, weeds and other plants on the ranches, and gathering data in general in regard to plants now growing on the Islands.

On the slopes of Mauna Kea, along the ditches on the windward side of the Kohala Mountain, and in the paddocks of the Parker Ranch he has got many valuable specimens. Mr. Rock expects to return to Honolulu at the end of June.

Very respectfully,

R. S. HOSMER,
Superintendent of Forestry.

Honolulu, July 1, 1910.

R. S. Hosmer, Esq., Superintendent of Forestry, Honolulu, T. H.

Dear Sir:—The following is a report of the principal work done during the month of June:

PLANT DISTRIBUTION.

	In seed boxes.	In boxes transplanted.	Pot-grown.	Total.
Sold.....	2,000		458	2,458
Gratis....	500	3,017	3,801	7,318
				<hr/> 9,776

The sum of \$30.60 was collected for plants sold and the same has been deposited with the Treasurer as a realization.

The demand for trees is increasing, and several large orders are on file for trees to be delivered within the next five months. A few of the largest are given below:

Honolulu Plantation Co.....	121,000
Waialua Agricultural Co.....	150,000
Hamakua Mill Co.....	6,000
Kilauea Plantation Co.....	10,000
	<hr/> 287,000

In addition to the above, we expect a number of orders from homesteaders. We have already received from the Thompson Settlement, Waiohinu, Kau, Hawaii, orders for over 3,000 trees to be delivered as soon as possible. The different military camps and forts are also drawing heavily upon our stock. The County Supervisors are applying for quantities of trees for road planting and for parks, etc. We will again commence shipping plants to Pupukea Water Re-

serve on July 5, and continue at the rate of 2,000 a week, there being about 10,000 more required to complete the planting on Reserve C. Should it be decided to fill all the orders now on file and at the same time supply the regular demand, also have a stock ready for Arbor Day, it will be necessary to increase the number of men and also make arrangements for large supplies of material for boxes and benches, etc. Arrangements in connection with the above subject ought to be made at once, so that the trees can be got ready in time for the planting season, which commences about the first of November. A small gooseneck dray for carting plants from Makiki and the Nursery is required. At present we have two wagons, the large one being too heavy, even when empty, for one horse to pull up the valley. The small one is only suitable for a very light load. Soil and firewood have to be carried up to the station in the valley, and a great deal of hauling will have to be done should it be decided to fill all the orders now on file.

The two seed men have been collecting *Grevillea robusta* and *Eucalyptus* around the city and on Tantalus.

Makiki Station.

The three men at the station have spent most of their time in transplanting seedlings, weeding and attending to the trees, preparing and sterilizing soil, etc.

Nuuanu Station.

The man at the station has been clearing away vines from the trees and doing other routine work.

Respectfully,

DAVID HAUGHS,
Forest Nurseryman.

POTSDAM CAKES.—Sift into a mixing bowl two cups of flour and two teaspoonfuls of baking powder, add to this one cup of granulated sugar and one-half cup of butter softened, but not melted. Break into a cup two whole eggs, and fill it up with sweet milk. Stir this and pour into the mixture. Beat all briskly with a wooden spoon, flavor with vanilla and bake in gem pans. (Delicious cakes made by an easy and inexpensive recipe).—Germany.

FRUIT CUP.—Mix together the juice of half a lemon, one tablespoonful each of lime juice and pineapple, four ounces of sugar and two ounces of shaved ice. Fill up with milk, shake until foamy, and drink at once.

REPORT ON RICE AND COTTON INVESTIGATIONS IN CHINA AND JAPAN.

By F. G. KRAUSS.

(Continued from July issue.)

IV. AGRICULTURAL PRACTICE.

Rice is the staple product of Japan, and over fifteen million acres are devoted to its cultivation. Owing to the low temperatures of winter and spring, it is grown only as a summer and fall crop, except in restricted areas.* The land, however, is cultivated continuously, wheat and barley, as a winter crop, alternating with rice.

* The rice used for seed is usually taken from selected plants of the previous season. Before it is sprouted it is subjected to the "water-selection" test; the seed is immersed in a salt solution of 200 to 500 grams of salt to a liter of water. Only those seeds that sink are used. The seeds are allowed to soak in fresh water until sprouted, when they are sown broadcast in nursery beds. This is done in the latter part of April, for slow-maturing varieties; for quick-maturing varieties, in the early part of May.

The nursery beds are carefully prepared beforehand and are usually fertilized with a compost consisting of night soil, oil-seed cake and superphosphate. The following formula was furnished by the Fukuoka Demonstration Station:

GENERAL MANURE FOR RICE SEED-BED OF ONE TAN.*

	Kwan.	N.	P ₂ O ₅ .	K ₂ O.
Compost Manure—Horse, cow and pig manure; with about 1/10 human excrement and 1/4 in bulk of loam.....	160	0.800	0.416	1.008
Fæces—Night soil.....	80	0.456	0.104	0.216
Oil Seed Cake—Rape seed cake	5	0.252	0.100	0.065
Superphosphate of Lime....	5	....	0.750	....
Total.....	250	1.508	1.370	1.978
* 1 tan = .245098 acres.			A kwan = 9.264462 lbs.	

* In southern China two and even three crops are grown annually as in Hawaii

When the seedlings are about forty-five days old they are transplanted into clumps. According to the variety and time of planting, a clump will consist of from three to nine seedlings. The clumps are placed eight to ten inches apart in rows eight to ten inches apart, as is the Hawaiian practice.

The main paddy fields, having been previously croppped to wheat or barley, which is harvested in the latter part of May, the ground is immediately plowed and harrowed either by hand or in a primitive way with the aid of animals. The fields are then manured. The following materials, in the quantities given, constitute one of the generally-adopted fertilizer applications recommended by the Fukuoka Station (see analyses):

GENERAL MANURE FOR PADDY FIELDS OF ONE TAN (about $\frac{1}{4}$ acre).

	Kwan.	N.	P ₂ O ₅ .	K ₂ O.
Compost Manure.....	160	0.800	0.416	1.00
Green Manure—Soy beans or 200 kwan genge.....	100	0.580	0.080	0.730
Soy Bean Cake.....	12	0.840	0.120	0.240
Superphosphate of Lime.....	6	....	0.900	....
	278	2.220	1.516	1.978

Special attention is called to this green manure fertilization, as it is one of the chief sources of nitrogen in Japanese rice cultivation. As indicated, the green manure may be derived from soy beans (*Glycine hispida*), or from Genge (*Astragalus sinicus*). A number of other plants, however, are utilized for green manure, especially the broad or Windsor bean (*Vicia faba*), and Burr clover (*Medicago denticulata*).

When Genge is used as a green manure, seed of it is sown among the rice a few weeks before harvest (September-November), or immediately after the drawing off of the irrigation water. The seed has germinated by the time the rice is cut (usually in November), and the plants grow rapidly as soon as freed of shade. If refuse straw is available, a thin layer is scattered over the young plants as a mulch. By the end of May the plants have obtained their maximum growth and are ready to be turned under for the succeeding rice crop. A maximum yield is about twenty tons per acre, and twenty tons is sufficient to green manure five acres. With unfavorable conditions, however, a crop may not be more than enough to manure the area upon which it is grown. When mature, the crop is harvested and distributed among the fields in proper amounts along with bean cake, compost, and sometimes phosphates. The amount of each used and the propor-

tions maintained depend largely on the character of the soil, the treatment it has previously received, the climate and the variety of rice to be grown, but the amounts and proportions are regulated so as to secure in the end, to the area mentioned, 80 pounds of available nitrogen, 80 pounds, in all, of phosphoric acid, and 80 pounds of actual potash.

In connection with the growing of Genge, it is interesting to note that, since the accumulation of nitrogen by the plant is accomplished by the symbiotic growth with its root bacteria, an inoculation of soils with this bacteria becomes necessary before the crop will thrive, a law that has been found of equal favor in the culture of alfalfa and other legumes.

In the making of composts, horse, cow, pig and poultry manures, night soils, vegetable refuse, street sweepings and dredgings from the rivers and canals are used. This material and soil and straw are spread in alternating layers. The mass is worked over monthly, and after two to four months' decomposition is ready for application, along with the other fertilizers. The composting is always done under cover to prevent deterioration. The usual custom is to apply the compost to the spring crop, which is either wheat or barley. The amount applied varies from one to five or more tons per acre. Frequently the compost is fortified with phosphates, or phosphates may be separately applied. The rice crop, which follows the wheat or barley, receives considerable residual benefit from this manuring, but, as is shown elsewhere, heavy additional fertilization is practiced for the maintenance of maximum fertility.

In addition to the oil cakes mentioned, some wood ashes and bones are used, and more recently somewhat limited quantities of commercial fertilizers. There are a number of factories for the manufacture of commercial fertilizers in Japan, and the products are under government inspection. A plant for the manufacture of calcium cyanamide is also in operation, but the results thus far obtained give uncertain promise of its usefulness in rice cultivation. Lime is extensively used, as much as four tons of quick-lime being applied to the acre, though this amount is exceptional. The following list of fertilizers used in rice cultivation was furnished, along with their analyses:

CONCENTRATED ORGANIC MANURES.

	Nitrogen.			Phosphoric Acid.		
	Max.	Min.	Aver.	Max.	Min.	Aver.
Japanese rape cake.....	6.12	4.04	5.09	3.62	1.02	2.18
Chinese rape cake.....	6.76	4.27	4.89	2.82	1.22	2.27
Chinese rape with straw	6.65	4.35	4.80	2.67	1.22	2.24
Indian rape cake.....	6.65	4.09	4.82	2.71	1.36	2.01
Soy bean cake.....	7.96	6.30	7.02	1.54	0.93	1.32
Cotton seed cake (with hulls removed).....	7.62	5.09	6.39	3.10	1.72	2.69
Cotton seed cake (in- cluding hulls).....	4.99	1.90	3.86	2.86	0.28	1.73

Rice bran and fish guanos are extensively used, as is also peanut cake, castor pumpace to a lesser extent.

GREEN MANURES.

(Percentages of constituents in dry matter.)

	Water.	N.	P ₂ O ₅ .	K ₂ O.
“Genge” (<i>Astragalus sinicus</i>)..	16.72	2.25	0.41	1.71
Soy beans (<i>Glycine hispida</i>)....	14.00	2.49	.36	3.13

Of the oil-cake fertilizers, soy bean cake and rape cake are both considered very good and are used in enormous quantities. In addition to their own extensive production, the Japanese import large amounts of soy beans from Manchuria. The price of these commodities at the time the writer was in Japan was approximately as follows:

Soy bean cake.....	\$12.00 per ton
Rape seed cake.....	10.00 per ton
Cotton seed cake.....	9.00 per ton

The soy bean cake formerly sold for \$7.00 per ton, but as it is being exported to Europe in large quantities for cattle feeding, the price has steadily increased. The low value of cotton-seed cake is probably due to the fact that much of the cotton imported from China comes with the seed. Fish guano is used extensively, but is very expensive, costing about \$22.00 gold per ton. Of the several kinds of oil cake, the rice grower prefers soy bean and rape cake. The latter, however, is used principally to fertilize tobacco.

It is interesting also to know that the bulk of the rice bran is used as manure. The reasons for this are: first, powdered stone is used in milling the rice, which prohibits the use of the bran as a feed; second, there is comparatively little live stock in Japan to which it might be fed.

All these concentrated and highly-available manures excepting fish guano are used directly, in a finely-comminuted state, on the growing rice. The amount applied varies from one to two tons per acre, one-half when the seedlings are from three to four weeks old, and the remainder in August, about two months before the harvest. The second application, however, may be made in smaller quantities at intervals of two or three weeks. The fish guano is applied in much smaller amounts.

Often when there is an excess of fine material in the composts, that is substituted for ground oil cake. As has already been stated, human excrement, either solid or liquid, is rarely used directly in paddy fields for obvious reasons. Among the green manures, soy beans have usually given the best results, ton for ton, but the yields of a given area are considerably less than either Genge or bur clover, which are used to a much greater extent. In addition to the green manures especially grown, large quantities of grass and weeds are cut from waste places and incorporated into the soil. Sweet potato tops, when not feed to cattle, are also used with excellent results. Rice straw is seldom used for manuring, as it is considered more valuable for manufacturing purposes. It is largely used in making rice bags, matting, thatch, etc.

From the above, it will be evident that the Japanese practice is to manure to the limit and crop unceasingly. They have been doing so for a thousand years or more, and their land is more fertile today than when they began. The Hawaiian grower can take some valuable lessons from this.

Other crops which may prove valuable to the Hawaiian grower, are wheat and barley, to be grown in rotation with rice. There are many cultivated varieties of barley, which may be divided in a general way into the common hulled barleys and the hulless varieties. The former are extensively used in the brewing of beer, as a cereal to be mixed with rice for human consumption, and as a fodder for horses and cattle. The latter are grown wholly for human consumption. They have the special advantage of maturing earlier than the hulled varieties.

One hundred pounds each of the following standard varieties of Barley was secured for seed purposes: Katano (交野), a heavy-yielding variety with closely-adhering hulls, and Osome (お染), an early-maturing "naked" variety. Both have long been grown under the moist conditions of paddy fields.

Barley is not grown in seed beds and transplanted like rice. As soon as the rice is harvested the land is ridged, the ridges manured with compost, and the seed drilled in along the top to keep it free from excessive moisture. Wheat is less extensively grown in paddy fields than barley, because of the longer time required for maturing. In the warmer southern district, however, this does not constitute an objection. The method of cultivation of wheat is similar to that of barley. The yield of both crops on paddy fields greatly exceeds the yields on the uplands. The rotation of barley or wheat with rice seems perfectly feasible in Hawaii. The advantages of it are: first, freeing the land of flood water for half the year and the consequent benefits of aeration; second, the saving of labor in planting the second crop (since labor is such a problem), and, third, the reduced production of rice would stimulate the market and tend to increase prices, which have steadily declined in the past few years. With wheat or barley for the spring crop, the superior fall varieties could be grown exclusively, and beyond doubt all the barley and wheat that could be produced on our paddy fields would find a ready market, removing the objection continually raised against any other than a money crop.

A hundred pounds each of the most productive hulled and hulless barleys, suited to wet lands, were obtained for experimental uses. Barley is subject to the attacks of smuts, and as a matter of prevention the seed is usually treated with hot water. The method of treatment is to soak the seed first in cold water for five hours, after which it is left for one to two minutes in water at 120 F.; later for five minutes in water at 130 F. It is then put in cold water again, and after removal is dried sufficiently to permit of easy handling in sowing. This method, it is said, effectively kills all spores.

The introduction of Chinese and Japanese matting rushes as rotation crops with rice, or as substitute crops, has been considered by the station for several years, and experiments in their cultivation have been under way for some time. The growing of matting rushes is an important industry in Japan and one naturally jealously guarded by the manufacturing interests. The experiment stations, however, gave all the information sought in regard to rush cultivation.

The Bingo-i mat rush (*Juncus effusus* var. *decipiens* F. Buch) is more extensively grown in Japan than the Chinese mat rush (*Cyperus*). It appears to grow well in all parts of the country, and grows on all kinds of paddy soil when heavily manured. Heavy nitrogenous fertilization seems to be essential to obtaining the desired length of reed, the quality most lacking in our plants.

In the best practice, the strongest clumps of stubble remaining from the previous crop are dug up and divided into

small portions, which are planted into beds in the uplands, where they make comparatively little growth. In December and January they are transplanted to the paddy fields, from which the rice crop has just been harvested. The ground in the meantime has been carefully tilled and heavily manured with compost, fish guano or oil cake. As much as several tons of fish guano or oil cake per acre is sometimes applied, and the results seem to justify the large expense. In transplanting, the clumps which contain about twenty-five stalks, are set eight inches apart in rows eight inches apart, standing about as much irrigation as rice, and is carefully weeded and cultivated. About the middle of July it is ready for harvest, but the quality of the product depends largely on cutting at the proper time. When harvested too young, the reeds are soft, shrink easily, and often become discolored. When cut too old, they are coarse and brittle.

The reeds, as soon as harvested, are given a mud bath, after which they are dried in the sun. They are then graded according to length, color and strength, and their quality determines the price received for them, and the use to which they are put. Fine mattings and hats are the principal articles manufactured from them. The industry is considered a very valuable one in Japan. Good average yields are about 2500 pounds of cured reeds per acre. The yields of our experimental plantings compare favorably with those which I observed in Japan.

It is believed that with our increased knowledge of methods of cultivation, and our fine stock of plants, a start has been made towards the production of a rush of desired quality, and it is hoped that later more attention can be given to this work.

Although there appears to be at present no market for the coarser rushes, the fine samples recently received from the Heeia plantation are encouraging, and make a consideration of this crop seem worth while. In Japan the plant is called "Shititoi," and is grown in much the same way as *Juncus*, although it is more tolerant of salt. Both in China and Japan the reeds are split by hand. Here the industry can never be profitable until the splitting can be done by machinery. Our yields, compared with those obtained in China and Japan, are remarkably good, and while the reeds do not attain the desired length here, the growth is much denser. It is believed that heavier fertilization will increase the length of the reeds to the extent desired.

Other field crops which might profitably be introduced into Hawaii are ramie, hemp, jute, flax, mitsumota (*Edgeworthia papyrifera*), basket willows or osiers, soy beans, mungo beans, millet, rape, and indigo (*Polygonum tinctorium*), etc., all of which are extensively grown in Japan, many in rotation with

rice, or as a substitute for it. The Central Experiment Station expressed its willingness to supply the Station with seeds of any of these plants for experimental uses. An extensive collection of seeds was brought along, which will be tested during the coming year. Scions from what are considered the three best pomelos in the Orient, among them the far-famed Amoy pomelo, were also secured. Arriving here this bud-wood was handed to the station horticulturist, who has since reported that a number of the buds are growing.

It is believed, on the basis of the increased information as to cultural methods, and the seeds obtained, that a better project can now be planned for the extension of our rice industry, which was the principal object of the trip.

Visits were made to the Forestry station near Kumamoto and the Botanical Gardens in Tokyo. Desirable plants were observed and information secured in regard to them. Seeds and literature were also obtained, and a number of subsequent shipments made to the Territorial Board of Agriculture and Forestry.

(To be continued.)

THE JEQUIE MANICÓBA RUBBER TREE.

The following is taken from a special article, dealing with the Jequié Manicóba rubber tree (*Manihot dichotoma*), which appears in the *Tropical Agriculturist* for April, 1910:

During the past year, various owners of Manicóba rubber land [in Brazil] have been directing attention to the culture of this tree. I visited several plantations, ranging from a few acres to 100 acres in area. I was anxious to investigate the cultural capabilities of the tree. The owners of these lands are ignorant of the lines on which this culture should be initiated. They take it for granted that sticking the Manicóba seeds or cuttings into cleared ground is all that is necessary, without further attention. One important factor is in their favor: I refer to the wonderful tenacity of life and recuperative power pervading this plant. The primitive procedure by which the incipient seedlings and cuttings are left to take care of themselves with a view to establishing plantations, is antagonistic to the development of the trees, for nothing is more important than the proper treatment of young plants in the establishment of prospective great plantations. The result of the preliminary attempts in question was an aggregation of maltreated plants. In this connection it may be noted that about half a dozen

laborers only, men who know nothing about rubber cultivation, and who have nobody to instruct them, perform all the work appertaining to the upkeep of such plantations, comprising some 50,000 plants. Of course they have but few weeds to contend with—an important consideration—as they are in general suppressed by the peculiar soil and climatic conditions. I therefore could not help coming to the conclusion, that if these improvised plantations were placed under my control, I should replant them throughout. Anyhow, it is important to be able to add that I found two notable exceptions to this crude style of planting, one of which is concerned with a few thousand plants, and the other 50,000, on both of which intelligent methods of planting had been adopted. These two plantations, from a practical point of view, were decidedly encouraging. The seeds and huge cuttings or stumps had been planted only four months. The seedlings in this time attained a height of from 4 to 5 feet, and they were exceedingly healthy and vigorous. The huge cuttings are procured from the forest, that is to say, saplings in the forest are cut down and stuck into the cleared ground to form roots and permanent plants. These stumps measure from 6 to 8 feet in length, with both ends cut off, and in four months the vigorous shoots that spring from the top are 4 and 5 feet in length; thus there is a continuity of growth from the sapling to the established tree.

This plant is an invaluable acquisition to rubber cultivators. It can be cultivated at a minimum cost, consequent on its persistent tenacity and vigor, as is exemplified in its native soil, and because of its other merits, to which I have drawn attention. Further, it may be stated that the product of this tree is comparable with particular products cultivated in the tropics and elsewhere—products that flourish in a great measure by the restricted cultivation given. That is to say, when we discover a region pre-eminently adapted for a given culture, there it yields not only the best produce of its kind, but also far more economically.

Again, the humble dimensions of the *Manicoba* tree, I am convinced, are a factor in its favor, from a cultural point of view, for it attains a size exactly suited for close planting. In the great *Hevea* plantations under cultivation in the East, close planting is systematically resorted to, with the object of forcing early crops, which are available from young trees of limited size; for numbers collectively far more than compensate for the production of rubber per acre from full grown trees widely planted. As a matter of fact, big trees are stated in the East to be an encumbrance.

The number of trees usually planted in the East runs from 100 to 200 per acre, sometimes more. The number of *Manicoba* trees I advocate to be planted on one acre is 1,200. I estimate that 1,200 trees per acre (exclusive of certain returns in the fourth year) will yield 600 lbs. of rubber in the fifth year, and at least the same quantity annually thereafter for a long period of years.

In many rich Maniçoba zones, I computed the number of wild trees at more than 100 per acre, some 25 per cent. being tappable trees, and most of the remainder saplings, the forest growth of which is sluggish as compared with that of those under cultivation. It may be observed that a wild tree occasionally yields 1 lb. of rubber at a tapping, but the average is far less. One of the subsidiary advantages to accrue from cultivation is that of systematic control of the cropping by a special staff of workers, for the itinerant collectors of wild rubber cannot always be counted on.

POULTRY NOTES.

(Journal of Jamaica Agricultural Society.)

TURKEYS.—A FEW COMMON IDEAS NOT USUALLY KNOWN.—It is not usually understood yet that turkeys have very different ways from fowls. First, the gobblers are generally used far too young. A turkey gobbler is not mature enough for service until he is in his third year, and better still fourth year, and turkey hens are not mature enough for using as breeders until they are two years old. It is difficult to keep turkey cocks separate until their third year, but the careful breeder must do so if he wishes best results. Degeneration is quick in spite of good feeding if the eggs set are from young turkeys,—often this is the cause—usually thought mysterious, of loss of young turkeys. Then, again, unlike the ordinary cock, one service of a turkey gobbler fertilises the whole setting. Thirteen turkey hens to one turkey cock is sufficient. One of the biggest errors, but a common one, is the giving of peppers to very young turkeys.

TIME OF HATCHING.—Very few people, even those who have been handling poultry for some years know the different lengths of time eggs of different kinds of domestic birds take to hatch, and many also are under the impression that an incubator will hatch eggs more quickly than the birds. Of course the heat of the incubator is only a substitute for the heat of the domestic bird and the eggs hatch in the same time.

A fowl's eggs take 21 days, a turkey's 28 days, an "English" duck 28 days, but a Muscovy 34 days: the eggs of a goose take 28 to 30 days.

HINTS FROM LATEST EXPERIENCE.—THE SETTING HEN.—We have come to the conclusion that another cause (from those pre-

vously mentioned in the Journal) of poor hatches is that the setting hen does not cool the eggs enough. Some hens will not come off the nest every day if left to themselves, others come off for five minutes or so, then rush back. Twenty minutes is the minimum for the proper cooling of the eggs and in this climate half an hour even up to one hour, we find, rather does the eggs good, perhaps somewhat from the superior vitality of the hen, which is fed, refreshed and invigorated by an hour's exercise.

INCUBATOR CHICKENS.—We should like to be able to say that eggs hatched by the natural hen process produce chickens of more abounding vitality than those hatched by an incubator. But the only lot of chickens we have hatched by means of an incubator for some years were strong and lively from the day of hatching and were the most active chickens we have had—but they were mothered by a turkey within a day after hatching. We had a suspicion, however, when we regularly used an incubator and had chickens hatched by hens at the same time, that the hen hatched chickens were better layers and made better stock birds. This has never been proved, however, that we know of.

WATER.—The hottest weather of the year has come. For profit's sake, if not for the sake of the hens, see that there is plenty of fresh water set down for your fowls in shady corners out of the sun. Plenty of poor results with fowls are caused by not providing a supply of cool water.

STOCK NOTES.

(Journal of Jamaica Agricultural Society.)

THE DUAL PURPOSE COW.

It is still held by some contemporaries that there is not such an animal as a dual purpose cow—that a cow must either be “one to milk” or for beef. But that is because they have had no experience of the skill it takes to produce the real dual purpose cow. The cow of extreme dairy type and the cow of extreme beef type are easy to produce, but the herd of cows that are big and fleshy and yet can produce as much milk as a good herd of the extreme type of dairy animals, is the result of higher skill and judgment expended than on the other types. All types are profitable under certain circumstances, and the farmers in England who use the dairy Shorthorn and the dairy Red Poll, know what they are

about. There are herds of milking Shorthorns and Red Polls that average over 6,000 lbs. of milk with the best cows yielding over 15,000 lbs., and this not on the forced feeding carried on so commonly in the United States, but fed on pastures in the summer—rich pastures of course, manured and fertilized regularly.

MEASLY PORK.

We have had letters—several from the same district—asking what is the reason that some pigs when killed have mottled flesh, so that it is rejected by purchasers. And a good thing too that the appearance of the pork prevents people from buying it, for the “mottles” are simply the “cysts” containing the eggs of the tape worm, the same as affects the dog and human beings, and unless the flesh was very well cooked the cysts, entering the human stomach, would hatch out tape worms,—worst of all internal parasites.

PINEAPPLE LEMONADE.—Pineapple lemonade is a delicious and cooling beverage. The pineapple should be well ripened. Carefully remove the skin and eyes, and grate or cut in thin slices. Sprinkle half a pound of sugar over it, and squeeze over that the juice of four large lemons. Let it stand an hour. Mash through a fine sieve; add ice and water and some small pieces of pineapple.



Anyone sending a sketch and description may quickly ascertain our opinion free whether an invention is probably patentable. Communications strictly confidential. **HANDBOOK** on Patents sent free. Oldest agency for securing patents. Patents taken through Munn & Co. receive special notice, without charge, in the

Scientific American.

A handsomely illustrated weekly. Largest circulation of any scientific journal. Terms, \$3 a year; four months, \$1. Sold by all newsdealers.

MUNN & Co. 361 Broadway, New York
Branch Office, 625 F St., Washington, D. C.

Garden and Farm Tools and Implements

To do good farming you must have up to date tools to work with. We carry a most complete line of everything needed by the small or large farmer, from the smallest hand trowel to the largest cane plow. We also have a good assortment of Hand, Bucket or Barrel Sprayers. Our assortment of Hoes, Shovels, Spades, Mattocks, Rakes, Garden Shears, Lawn Mowers, Garden Hose, and other things that are needed daily about the farm or garden, is most complete and our stock large.

E. O. HALL & SON, LTD.

Office: Brewer Building, Queen St.
Works Iwilei,

Telephone 430.
Telephone 272.

The Hawaiian Fertilizer Co., Ltd.

HONOLULU, HAWAII.

MANUFACTURE AND DEAL IN ALL KINDS OF
Fertilizer and Fertilizer Ingredients

INCLUDING :

Bone Meal,	Sulfate Ammonia,
Nitrate Soda,	Sulfate Potash,
Double-Superphosphate,	Dissolved Guano,
Ground Limestone, etc., etc.	

BOARD OF DIRECTORS :

Chas. M. Cooke, President,	E. F. Bishop, Treasurer,
E. D. Tenney, Vice-President,	J. Waterhouse, Secretary,
Geo. H. Robertson, Auditor,	
W. M. Alexander	
C. H. Atherton,	
E. F. Bishop, Managing Director,	
Norman Watins, General Superintendent	

The products of this company are equal in every respect to any fertilizers sold in any market. In none of the conditions are they ranked by those manufactured elsewhere.

We will be pleased to furnish analysis of the soil of any locality in the Territory and make special fertilizers for different soil products arranging the composition to suit conditions.

Prices and Terms on Application.

Board of Agriculture and Forestry.

PUBLICATIONS FOR DISTRIBUTION.

Any one or all of the publications listed below (except those marked *) will be sent to residents of this Territory, free, upon application to Mailing Clerk, P. O. Box 331, Honolulu.

BOARD.

- Report of the Commissioner of Agriculture and Forestry for 1900; 66 pp.
Report of the Commissioner of Agriculture and Forestry for 1902; 88 pp.
* First Report of the Board of Commissioners of Agriculture and Forestry, from July 1, 1903, to December 31, 1904; 170 pp.
Second Report of the Board of Commissioners of Agriculture and Forestry, for the year ending December 31, 1905; 240 pp.; 8 plates; 10 text figures.
Third Report of the Board of Commissioners of Agriculture and Forestry, for the year ending December 31, 1906; 212 pp.; 3 plates; 4 maps; 7 text figures.
Fourth Report of the Board of Commissioners of Agriculture and Forestry, for the calendar year ending December 31, 1907; 202 pp.; 7 plates.
Fifth Report of the Board of Commissioners of Agriculture and Forestry, for the calendar year ending December 31, 1908; 218 pp.; 34 plates.
"Notice to Importers," by H. E. Cooper; 4 pp.; 1903.
"Digest of the Statutes Relating to Importation, Soils, Plants, Fruits, Vegetables, etc., into the Territory of Hawaii." General Circular No. 1; 6 pp.
"Important Notice to Ship Owners, Fruit Importers and Others: Rules and Regulations Prohibiting the Introduction of Certain Pests and Animals into the Territory of Hawaii." General Circular No. 2; 3 pp.; 1904.
"Law and Regulations, Importation and Inspection of Honey Bees and Honey." General Circular No. 3; 7 pp.; 1908.
"The Hawaiian Forester and Agriculturist," a monthly magazine. Vols. I to VI; 1904-1909. To be obtained from the Hawaiian Gazette Co., Honolulu. Price \$1 a year.

DIVISION ON ENTOMOLOGY.

- "The Leaf-Hopper of the Sugar Cane," by R. C. L. Perkins. Bulletin No. 1; 38 pp.; 1903.
** "A Catalogue of the Hemipterous Family Aleyrodidae," by G. W. Kirkaldy, and "Aleyrodidae of Hawaii and Fiji with Descriptions of New Species," by Jacob Kotinsky. Bulletin No. 2; 102 pp.; 1 plate; 1907.
* "On Some Diseases of Cane Specially Considered in Relation to the Leaf-Hopper Pest and to the Stripping of Cane," by R. C. L. Perkins. Press Bulletin No. 1; 4 pp.; 1904.
"A Circular of Information," by Jacob Kotinsky. Circular No. 1; 8 pp.; 1905.
"The Japanese Beetle Fungus," by Jacob Kotinsky and B. M. Newell. Circular No. 2; 4 pp., cut; 1905.
Report of the Division of Entomology, for the year ending December 31, 1905. Reprint from Second Report of the Board; 68 pp.; 3 plates; 10 text figures.
Report of the Division of Entomology, for the year ending December 31, 1906. Reprint from Third Report of the Board; 25 pp.; 7 text figures.
Report of the Division of Entomology, for the year ending December 31, 1907. Reprint from Fourth Report of the Board; 18 pp.; 1 plate.
Report of the Division of Entomology, for the year ending December 31, 1908. Reprint from Fifth Report of the Board; 26 pp.; 2 plates.

DIVISION OF FORESTRY.

- * "Forest and Ornamental Tree Seed for Sale at Government Nursery." Press Bulletin No. 1; 3 pp.; 1905.
* "Suggestions in Regard to the Arbor Day Tree Planting Contest." Press Bulletin No. 2; 7 pp.; 1905.
"An Offer of Practical Assistance to Tree Planters." Circular No. 1; 6 pp.; 1905.
"Revised List of Forest and Ornamental Tree Seed for Sale at the Government Nursery." Press Bulletin No. 3; 4 pp.; 1906.
* "Instructions for Propagating and Planting Forest Trees." Press Bulletin No. 4; 4 pp.; 1906.
"Instructions for Planting Forest, Shade and Ornamental Trees." Press Bulletin No. 5; 7 pp.; 1909.
"Na Hoakaka no ke Kanu Ana i na Laau Malumalu ame na Laau Hoohiwahiwa." Press Bulletin No. 6; 8 pp.; 1909.
Report of the Division of Forestry, for the year ending December 31, 1905. Reprint from Second Report of the Board; 77 pp.; 5 plates.
* Report of the Division of Forestry, for the year ending December 31, 1906. Reprint from Third Report of the Board; 123 pp.; 4 maps.
Report of the Division of Forestry, for the year ending December 31, 1907. Reprint from Fourth Report of the Board; 70 pp.
Report of the Division of Forestry, for the year ending December 31, 1908. Reprint from Fifth Report of the Board; 85 pp.

** This Bulletin will be sent only to persons interested in the subject

* Out of print.

Board of Agriculture and Forestry.

PUBLICATIONS FOR DISTRIBUTION—Continued.

DIVISION OF ANIMAL INDUSTRY.

- * "Inspection of Imported Live Stock." Rule 1; 1 p.; 1905
- * "Inspection and Testing of Imported Live Stock for Glanders and Tuberculosis." Rule 2; 1 p.; 1905.
- "Concerning Glandered Horse Stock in the Territory." Rule 3; 1 p.; 1905.
- * "To Amend Rule 1, Inspection of Imported Live Stock." Rule 4; 1 p.; 1907.
- "Rules and Regulations, Inspection and Testing of Live Stock." Rules and Laws; 11 pp.; Revised; 1910.
- "Quarantine of Horse Stock from California." Rule 8; 1 p.; 1908.
- Report of the Division of Animal Industry, for the year ending December 31, 1905.
Reprint from Second Report of the Board; 62 pp.
- Report of the Division of Animal Industry, for the year ending December 31, 1906.
Reprint from Third Report of the Board; 41 pp.; 3 plates.
- Report of the Division of Animal Industry, for the year ending December 31, 1907.
Reprint from the Fourth Report of the Board; 104 pp.; 6 plates.
- Report of the Division of Animal Industry, for the year ending December 31, 1908.
Reprint from Fifth Report of the Board; 44 pp.

DIVISION OF FORESTRY.

FOREST AND ORNAMENTAL TREE SEED AND SEEDLINGS FOR SALE AT THE GOVERNMENT NURSERY.

The Division of Forestry keeps constantly on hand at the Government Nursery, seed and seedlings of the important native and introduced trees. These are sold at prices just covering the cost of collection or growing.

The list includes both forest and ornamental trees, such as Silk Oak, Koa, various species of Eucalyptus, Golden and Pink Showers, Pride of India, Poinciana, Albizzia, etc. The price of the seed varies from 10 to 50 cents per ounce. The seedlings may be had for 2½ cents each, except a few kinds which are 5 cents. Seed of the various palms is also for sale; the price per 100 varying from \$1.00 to \$2.50. All seed is tested before being sent out, which insures its being good.

All communications in regard to seed or trees should be addressed to David Haughs, Forest Nurseryman, Box 331, Honolulu, Hawaii.

RALPH S. HOSMER,
Superintendent of Forestry.

DIVISION OF ENTOMOLOGY.

To give information about insects free of charge is one of the duties of this Division and Hawaiian readers are hereby invited to make inquiry in person and by mail. In order to be able to advise intelligently or send the right kind of useful insects for relief we like and sometimes it is indispensable for us to see the insect suspected or caught in the act, also specimens of the injury. In a tin with a hole or two, or a wooden box specimens may be mailed at 3rd class rates. When specimens are not accompanied by letter *always* write your name and address in the upper left-hand corner of the package. Address all communications SUPERINTENDENT DIVISION OF ENTOMOLOGY, P. O. BOX 331, HONOLULU, HAWAII.

EDW. M. EHRHORN,
Superintendent.

VOL. VIII

SEPTEMBER, 1910

No. 9

Price, 10c. Per Copy; Per Annum, \$1.00; Foreign, \$1.25.

THE
Hawaiian Forester
AND
Agriculturist

A MONTHLY MAGAZINE

OF

Forestry, Entomology and Agriculture

ISSUED UNDER THE DIRECTION

OF THE

BOARD OF COMMISSIONERS OF AGRICULTURE
AND FORESTRY.

PUBLISHED MONTHLY.

Entered as second-class matter at the Post office, at Honolulu, Hawafi.

ADDRESS ALL COMMUNICATIONS TO

DANIEL LOGAN,
EDITOR "THE FORESTER,"

P. O. BOX 366,
HONOLULU, H. T.

For business relating to advertising or subscriptions, address

HAWAIIAN GAZETTE CO., LTD., Publishers,
VON HOLT BLOCK, 65 S. KING ST., HONOLULU, HAWAII.

CONTENTS:

	PAGE.
Editorial	243-247, 275
Reports of Superintendent of Forestry	248
Division of Entomology	250
Botany and Horticulture at the College of Hawaii (MacCaughey)	252
Kahoolawe Forest Reserve	264
Forest Reserve Hearing	267
Report on Rice, etc. (Krauss)	271
Additions to Forest Reserves (proclamations)	277

OFFICERS AND STAFF OF THE BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY.

COMMISSIONERS.

Marston Campbell, *President and Executive Officer.*
 J. M. Dowsett P. R. Isenberg
 H. M. von Holt Albert Waterhouse

DIVISION OF FORESTRY.

Ralph S. Hosmer, *Superintendent of Forestry and Chief Fire Warden.*
 David Haughs, *Forest Nurseryman.*
 Joseph F. Rock, *Botanical Assistant.*
 David Kapihe, *Forest Ranger for Tantalus.*

DIVISION OF ENTOMOLOGY.

Edward M. Ehrhorn, *Superintendent of Entomology and Chief Inspector.*
 Albert Koebele, *Consulting Entomologist.*
 H. O. Marsh, *Assistant Entomologist.*
 D. B. Kuhns, *Inspector.*
 Fred Muir, *Beneficial-Insect Collector.*
 Bro. M. Newell, *Fruit and Plant Inspector, Hilo, Hawaii.*
 Robert R. Elgin, } *Honorary Fruit* { *Mahukona, Hawaii.*
 W. O. Aiken, } *and Plant Inspector* { *Kahului, Maui.*
 W. D. McBryde, } *at* { *Koloa, Kauai.*
 Dr. W. B. Deas, } { *Hana, Maui.*
 Wm. Robb, } { *Lahaina, Maui.*

DIVISION OF ANIMAL INDUSTRY.

Victor A. Nörsgaard, *Superintendent of Animal Industry and Territorial Veterinarian.*
 L. N. Case, *Assistant Territorial Veterinarian.*
 John Vanhuizen, *Live Stock Inspector.*
 J. C. Fitzgerald, *Deputy Territorial Veterinarian for Maui.*
 H. B. Elliot, *Deputy Territorial Veterinarian for Hawaii.*
 A. R. Glaizyer, *Deputy Territorial Veterinarian for Kauai.*

SECRETARY TO THE BOARD.

Miss Elsie M. Kuhn

CLERK AND STENOGRAPHER.

Miss Melika Peterson

EDITOR OF THE "FORESTER."

Daniel Logan

LIBRARIAN.

Miss Ella K. Dayton

THE HAWAIIAN FORESTER ^{and} AGRICULTURIST

VOL. VIII

SEPTEMBER, 1910

No. 9

ADDITIONS TO FOUR FOREST RESERVES.

The forest reserve system of the Territory of Hawaii is slowly being brought into final form. By a proclamation signed by Governor Frear on August 25, 1910, all the government lands included within the boundaries of the established forest reserves are now technically set apart.

When the forest reserve law was passed in 1903 only unleased lands or those on which the lease ran out within two years could be set apart. In 1907 the law was so amended as to permit the formal reservation, subject to existing leases, of any government land whether under lease or not.

In some of the first created reserves it followed that there were government lands not technically set apart. The action of Governor Frear gives to these tracts a legal forest status and puts an end to uncertainty regarding them. In accordance with the regular usage the formal setting apart of unreserved lands in the Hilo, the Kau and the Hamakua-Pali forest reserves on Hawaii and the Ewa forest reserve on Oahu was considered at a public hearing held on August 20, 1910, along with agreements for the setting apart of Kahoolawe as a forest reserve.

THE CACTUS DISCOUNTED.

An article in the Bulletin of the Imperial Institute disposes rather effectually of certain extravagant claims regarding the economic value of the prickly pear. The first claim answered is that from one ton of prickly pear seven gallons of alcohol could be prepared at a cost not exceeding 3s. 6d. per gallon, whilst the refuse could be made into a nutritious cattle food. "Alcohol of 90 per cent.," it is answered, "can be manufactured from cheap materials, such as maize and potatoes, at a cost of from 6d. to 1s. per gallon, depending on the market price of the raw materials and other local factors. It is evident, therefore, that the production of spirit from prickly pear juice could only be remunerative in a country which had no other crops available for the purpose, and which had a heavy duty on imported alcohol. Moreover, the researches

of Ulpiani and Sarcoli in 1902 have shown that not only would the manufacture of alcohol from prickly pear juice be unprofitable, but also that it is scarcely practicable." (The reasons for this are quoted in the article.)

Next is taken up the assertion that the plant yields an excellent sugar, two tons of prickly pear yielding as much sugar as three tons of sugar cane, and of equal quality. This is briefly replied to in these words: "With regard to the manufacture of sugar from the prickly pear, it is obvious that if the contention of Ulpiani and Sarcoli, that the juice contains only glucose and fructose, is correct, no cane-sugar could possibly be obtainable."

Third and last comes the claim that the fibrous nature of the material renders it suitable for the manufacture of paper, strawboard and other articles, and that these could be produced more cheaply from prickly pear than from any product now used for the purpose. Remorselessly the critic gives the results of examinations of samples of a South American species, occurring also in India, which were shown at the Colonial and Indian Exhibition held in London in 1886. Paper makers who examined them "regarded them as worthless in comparison with other cheap and plentiful materials." Further, it is shown as probable that the collection of the raw material would be a costly operation. "Moreover," the critic says, with proof from official analyses in the United States, "a little consideration will show that an immense quantity of the plant would have to be dealt with in order to produce a comparatively small amount of paper pulp." It is concluded as seeming "evident that the project could not possibly be remunerative, especially as the product is of low quality and would not in any case be worth more than a few pounds per ton."

As if all this were not enough to make the plant in question economically despised, the critic says: "It appears that the only purpose for which the prickly pear could be used successfully is as a cattle food. Opinions with regard to the value of the material for this purpose, are, however, very conflicting, and at best it would constitute a product of somewhat low nutritive value, and could only be used in conjunction with richer feeding stuffs, such as wheat bran or cotton seed meal." Even with regard to the spineless variety of prickly pear, to which allusion had been made in a previous article on the subject as having been produced in California, it is declared as not appearing safe "to encourage the cultivation of such forms until they have been subjected to prolonged trials, especially as there is always a danger that they may revert to the spiny condition."

There is not much left to the cactus as an economic plant after such a formidable array of its deficiencies.

KAHOOLAWE FOREST RESERVE.

For some years the Territory of Hawaii has been confronted with a serious conservation problem in the island of Kahoolawe. As the result of long continued overgrazing this little island, once a valuable asset to the Territory, has become almost worthless through erosion and loss of soil. The first step toward its reclamation has now been taken in the formal setting apart of the island as a forest reserve. This action is taken now in order that upon the expiration of the existing lease, some thirty months hence, Kahoolawe may be brought under the care and administration of the Territorial department best equipped to handle its reclamation—the Board of Agriculture and Forestry.

Following the prescribed method a public hearing to consider the setting apart of Kahoolawe as a forest reserve was held by the Governor of the Territory and the Board of Agriculture and Forestry on August 20, 1910, following which a proclamation has been signed by Governor Frear, setting apart the island as the Kahoolawe Forest Reserve.

A statement of the *Journal d'Agriculture Tropicale*, that work had been done in Hawaii showing that the best soils for pineapples are those which contain 5.61 per cent. of manganese sesquioxide, while the least suitable contain only 0.37 per cent. of this substance, is corrected by the *Barbados Agricultural News* on the authority of Press Bulletin No. 23 of the Hawaii Agricultural Experiment Station, "in which the work to which reference has been made is described. This shows that, while manganese in small quantities may act as a stimulant to plant growth, in large amounts it is extremely injurious."

Java white sugar has already turned out all the German product on the Indian markets, and to a great extent all the Austrian, according to an article by H. C. Prinsen Geerligs in the *International Sugar Journal* for June. Nevertheless, the production of yellow sugars has in no way suffered by the export of white, but has even increased. In 1900, Java produced 700,000 tons of refining sugar; last year the amount increased to 1,000,000 tons. The production of the island has tripled during the past twenty years, while in the same period the proportion of white sugar has risen from one-half per cent. of the total turnout to almost 20 per cent. Java's capture of the Indian market for white sugar is due to special catering to the prevailing religion of the country. Sugar to be consumed in India must be free from contamination of animal matter, this being prohibited by the Hindus on account of their religious sentiments. Therefore the first

factories taking up the manufacture of white sugar in Java were specially equipped to make it without refining and without the use of animal charcoal. After describing the Javanese mode of manufacture, Mr. Geerligs says: "All the plant for the manufacture of raw sugar may be retained, and it is only necessary to add a sulphur oven, the requisite piping and a few centrifugals to make white sugar. Then, either white sugar or the raw product may be manufactured, according to the conditions obtaining on the market."

In one of his "Practical Talks to the Farmer," Mr. F. D. Coburn, the distinguished secretary of the Kansas department of agriculture, points out the risks in alfalfa seed. He tells about seed supposedly costing \$7.80 per bushel, which when cleaned was found to have cost actually \$13.74 per bushel. "The Oklahoma station," he says, "among many samples, tested one having 60 per cent. pure seed and 40 per cent. impurities, while only 65 per cent. of the pure seed was germinable." His concluding advice may be valuable to some alfalfa growers in Hawaii. Mr. Coburn, after showing by examples the danger of sowing seeds of weeds along with alfalfa seed, remarks: "These findings pointedly suggest that it is safe to buy seed of only a thoroughly reputable dealer or grower whose name and guarantee stand for something. Safety lies in securing samples early and testing them. The buyer should learn positively that it is alfalfa seed, and not something else, and that it will grow. If more than 10 per cent. fail to germinate, he makes a mistake to buy it, for something is wrong. Choice seed, the only kind worth sowing, always commands a good price, and is worth it. The agricultural department at Washington, or the State experiment stations, will test samples of seed sent and report on them without charge."

Tropical Life (London) is devoting much attention to insect and fungus pests that attack rubber plantations. Several articles in the July number refer to the subject. One cause of the trouble mentioned is the leaving of rotten logs and stumps in land that has been cleared of other growths to make way for the planting of rubber trees. The same magazine quotes an address by Mr. Rudolph Anstead, an East India government scientific expert, before the Nilgiri Planters' Association, in which the cross-fertilization of coffee is recommended to give the bushes resistant quality against disease. The speaker referred to what had been achieved through the cultivation of hybrids in the protection of sugar cane, cotton and other products, in the West Indies and elsewhere, from diseases and pests.

Referring to an account of experiments at the Hawaii Agricultural Experiment Station in growing cotton (*Caravonica*) from cuttings and by budding, the Barbados Agricultural News says: "As Sea Island cotton is only grown as an annual, these trials are not as important, in relation to it, as they are in connection with the *Caravonica* variety. The feasibility, however, of raising the first-mentioned kind from cuttings may be worth trying, as it may form a means, under certain conditions, of conserving a given strain in a certain district when, for any reason, circumstances have interfered with the continuation of its propagation from seed."

Dr. Gooding, in Barbados, has been experimenting in the direction of procuring hybrids between Sea Island cotton and the ordinary native cotton of the perennial type. The plants attained a large size, but the extra growth had been anticipated, and allowed for, by setting them much farther apart than Sea Island cotton is usually planted. Under exactly similar conditions, the yield of hybrid cotton was much higher than that from the ordinary Sea Island—in terms of weight per acre being more than twice as great. A special report on the cotton showed that the qualities of the two types were practically the same, as the lint was of excellent length, strength and fineness, and the same price was obtained for both kinds. The Agricultural News cautiously observes that "further experiments are required to show if heavy bearing is a definite property of the strain obtained, or whether it is due to the stimulus of crossing and a greater immunity from disease of the hybrids."

Practical articles by specialists in any line of agricultural industry would be cordially welcomed by this magazine. From five hundred to two thousand words would be appropriate for length, only let each article contain something complete and definite in useful information to readers needing it on the particular subject. Some of our exchanges excel *The Forester* and *Agriculturist*, more than anything else, in the variety of topics discussed by contributors. This magazine goes to all quarters of the globe, and might be made a great promotion medium for Hawaii if the leading men engaged in our diversified industries let the outside world know through its pages something about what they are doing. That an elucidation of their methods and results obtained therefrom would attract attention is certain, judging from the frequency with which reports of the work of experts at the government and the sugar planters' experiment stations here are quoted by agricultural periodicals in foreign lands.

*REPORTS OF THE SUPERINTENDENT OF FORESTRY
ON FOREST RESERVES.*

Honolulu, T. H., June 22, 1910.

The Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen:—In three of the regularly established forest reserves on the island of Hawaii—the Hilo, the Kau and the Hamakua-Pali—and in the Ewa forest reserve on Oahu are areas that according to the law as it now stands have not been formally set apart. When the forest law (Act 44, 1903: Chapter 28, Revised Laws) was first enacted it was so worded as to permit the setting apart only of Government land not under lease, or on which the lease had less than two years to run. Subsequently by Act 4 of the Session Laws of 1907, the law was amended so that the Governor may now set apart any government land within the boundaries of a forest reserve, whether under lease or not, provided, however, that on lands under lease the reservation shall not go into effect until the end of the existing lease, when it automatically becomes operative.

At the time the above named forest reserves were created the old law was in force. A number of government lands within their boundaries were then under lease for more than two years consequently these lands could not at that time technically be set apart, although recognized as being within the boundaries and forming part of the forest reserve.

A similar condition on Maui in the Koolau and the Hana forest reserves was remedied through a proclamation signed by Acting Governor A. L. C. Atkinson on June 12, 1907, setting apart certain specified lands within the boundaries of those reserves. The formal reservation of the lands in the reserves on Hawaii and Oahu has been delayed from time to time for a variety of reasons. The matter ought now to be finally acted on and disposed of.

Following the precedent already established on Maui, I think a short proclamation referring to the creation of the forest reserve and naming the lands now to be set apart would be sufficient; this action to be taken after the usual public hearing. Accordingly I recommend that the Board request the Governor to call the necessary hearing and thereafter to set apart as parts respectively of the Hilo, the Kau, the Hamakua-Pali and the Ewa forest reserves the tracts of government land listed in the following tables. This action will bring all of the government land lying within the forest reserve boundaries into the fully reserved class, save that on several of the lands the actual reservation will still not take effect until the expiration of existing leases that have yet some time to run.

The lands to be reserved are as follows :

HILO FOREST RESERVE.

Unleased.

<i>Name.</i>	<i>Area.</i>
Humuula	3,901
Kahoahuna	46
Waikaumalo - Maulua.....	790
Opea - Peleau.....	230
Kamaee - Wailua.....	930
Wailea - Kaiwiki.....	3,834
	<hr/>
	9,731

Leased.

<i>Name.</i>	<i>Area.</i>	<i>Lease Expires.</i>
Piha	3,780	Feb. 10, 1912
Piihonua	33,941	Mar. 21, 1921
	<hr/>	
	37,721	

Area recommended formally to be set apart 47,452 acres.
 Area of government land already technically set apart in the
 Hilo forest reserve, 12,771 acres. Area of privately owned land
 in the reservel 49,777 acres. Total area of the Hilo forest reserve,
 110,000 acres.

KAU FOREST RESERVE.

Unleased.

<i>Name.</i>	<i>Area.</i>
Moaula .. . . . . .	....
Kopu - Makaka.....	....
Mauka	46.40

Leased.

<i>Name.</i>	<i>Area.</i>	<i>Lease Expires.</i>
Puumakaa	5,750	May 24, 1923
Kiolakaa Forest .. . . . . .	....
Waiohinu	10,740	April 11, 1914
Kaalaala - Makakupu Forest....	7,122	July 1, 1924
	<hr/>	
	23,612	

Area recommended formally to be set apart, 23,658.40 acres.
 Area of government land already technically set apart, 35,959.60

acres. Area of privately owned land in the reserve, 6,232 acres. Total area of the Kau forest reserve, 65,850 acres.

HAMAKUA-PALI FOREST RESERVE.

Leased.

<i>Name.</i>	<i>Area.</i>	<i>Lease Expires.</i>
Waimanu	200	Jan. 1, 1920

Area recommended formally to be reserved, 200 acres. Area of government land already technically set apart in the Hamakua-Pali forest reserve, 16,133.20 acres. Area of privately owned land in the reserve, 2,606.80 acres. Total area of the Hamakua-Pali forest reserve, 18,940 acres.

EWA FOREST RESERVE.

Leased.

<i>Name.</i>	<i>Area.</i>	<i>Lease Expires.</i>
Aiea	383	Jan. 14, 1912

Area recommended formally to be reserved, 383 acres. Area of government land already technically set apart in the Ewa forest reserve, 4,768 acres. Area of privately owned land in the reserve, 23,399 acres. Total area of the Ewa forest reserve, 28,550 acres.

For further information in regard to these forest reserves reference may be made to the reports and proclamations regarding them and to the Report of the Division of Forestry for 1906, which contains maps and tables of areas of the lands therein.

Very respectfully,

RALPH S. HOSMER,
Superintendent of Forestry.

DIVISION OF ENTOMOLOGY.

Honolulu, Hawaii, July 31, 1910.

Honorable Board of Commissioners of Agriculture and Forestry,
Honolulu.

Gentlemen:—I respectfully submit my report of the work of the Division of Entomology for the month of July.

Of 29 vessels boarded we found fruit, plants and vegetables on 17. The usual care was exercised in the rigid inspection and the following disposal made:

<i>Disposal with principal causes.</i>	<i>Lots.</i>	<i>Parcels.</i>
Passed as free from pests.....	781	14,594
Fumigated before releasing.....	7	19
Burned	4	6
Total inspected	792	14,619

PESTS INTERCEPTED.

A box of banana plants arrived from Fiji and according to regulations was prohibited from landing. It was interesting to find that nearly every plant was infested with the banana borer (*Sphenophorus sordidus*) and only goes to show that the regulation prohibiting banana plants from being admitted is a very wise one.

On a shipment of plants from Hongkong we found some leaf rollers in larvae and pupae and destroyed the plants. We are keeping close watch on all plants from the Orient on account of the existence of many lepidopterous pests. Shipments to California from Japan were found infested with the Gypsy moth which is causing such damage in Massachusetts. Several lots of sweet potatoes were taken in the Chinese immigrant baggage on account of being infested with the sweet potato borer, *Cylas fornicarius*.

On July 19th the Br. steamer Makura brought a consignment of 5 snakes belonging to a show man. The Collector of Customs promptly refused the landing of these and asked your Superintendent to kill the reptiles. After receiving a written request to do so I took charge of the matter and used Hydrocyanic Acid gas 5 times as strong as is customary and subjected the snakes to the fumes for two hours. The Collector has kindly presented the Board of Agriculture and Forestry with the snakes for our museum and I am preparing them in Formaldehyde for a permanent exhibit. These are the largest snakes ever brought to Honolulu, one measuring nearly nine feet.

From the Inspector at Hilo, the following report was received:

Seven vessels inspected and a total of 107 lots containing 1194 parcels were examined and passed.

On July 18th my new assistant, Mr. H. O. Marsh, arrived. Mr. Marsh has been doing considerable field work for the U. S. Department of Agriculture and since his arrival I have been able to show him some of the damage done by various pests to our truck crops and flowering plants. Mr. Marsh will carry on investigations in the field and breeding experiments in the laboratory.

Another shipment of parasite material arrived from Mr. J. P. Baumberger from California, but unfortunately the box was crushed in the mail, damaging some of the material. Mr. Baumberger has written me that he will soon be able to send us more of the cabbage butterfly parasites.

Very truly yours,

EDW. M. EHRHORN,
Superintendent of Entomology.

BOTANY AND HORTICULTURE AT THE COLLEGE OF HAWAII.

By Prof. Vaughan MacCaughey, College of Hawaii.

I. Introductory.

Much interest is expressed concerning the College of Hawaii and its manifold relationships to the Territory for whose welfare it exists. This interest pervades the entire community, being most evident among those who are directly or indirectly in touch with the actual teaching work of the institution, and among those who look to the College for tangible results of an investigational and utilitarian nature.

The Territory of Hawaii is distinctive in the agricultural nature of its industries. It is essentially a farming country, although the agriculture is organized upon a peculiarly extensive and corporate basis. Because of the large size of the agricultural enterprises, the subsidiary engineering, manufacturing and transportation industries are concomitantly well developed. The industrial problems of the islands, (excepting those intricate sociological complexes that have as yet been scarcely thought of), can, therefore, be divided into two great groups—those relating to agricultural enterprises, and those relating to the industries comprehended by the broad term engineering.

Botany and Horticulture are two great sciences that integrate with agricultural businesses. The range of the former is that of the gigantic and dominant vegetable kingdom, with its innumerable and diverse forms; the latter being the art and science of certain plants useful to man—fruits, flowers, vegetables, ornamentals. Horticulture is both an art and a science — it applies the profound laws of plant life to the simple processes of the fern-house, the vegetable garden, the vineyard.

II. Botanical Conditions in Hawaii.

Hawaii is unique in the endemic nature of its indigenous flora. No other region of similar area in the world has so large a proportion of peculiar plants. A surprisingly wide range of plant life is comprehended. The great variety of environmental conditions has produced striking series of morphological variations. A group of very interesting problems is furnished in the relations between the development of the flora and the geological development of the Islands. Kauai is richest, botanically, being oldest; Hawaii has a comparatively scant flora.

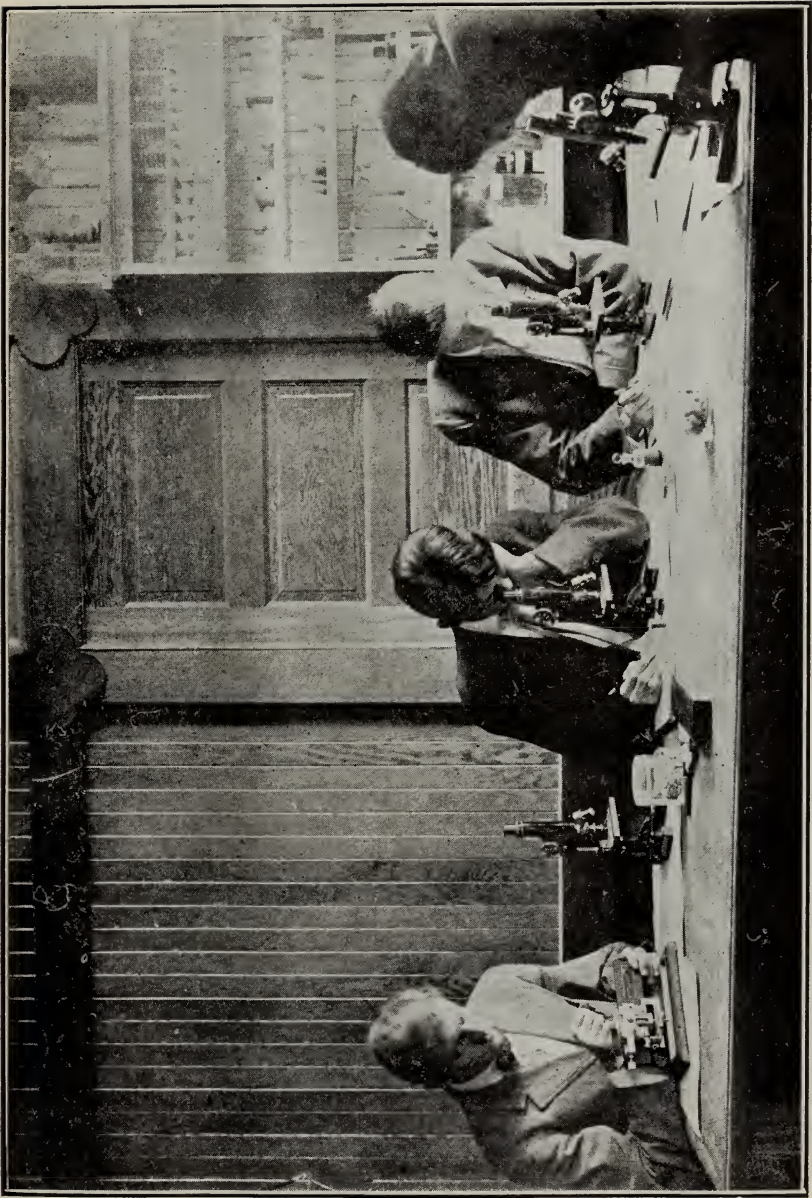


Fig. 1. PORTION OF BOTANICAL LABORATORY, SHOWING CLASS AT WORK.

The zonation of plants offers another striking series of problems. All are familiar with the changes in the vegetation noticed as one travels from the beach up into the mountains. Study has already shown that the various species of plants inhabit more or less definite geographical zones, but these zones of distribution are only partially known.

The life and customs of the ancient Hawaiians is to the botanist a fruitful field for study. The language abounds in picture-words drawn from or relating to the phenomena of plant life. The ancient meles contain many references to important native plants, such as the cocoanut, maile, lehua, milo, etc. Habitations, clothing, canoes, weapons and utensils, vessels and containers, medicines, fibers, and the bulk of the food supply, were all derived from plants. The Hawaiian's relation to the plants of his environment was intimate and minute, and it is very unfortunate that their extensive plant lore has so largely passed into oblivion.

There is not only this rich abundance of indigenous plant life, but also a bewildering variety of introduced plants. These have been brought in from all parts of the world, though chiefly from tropical and temperate regions. Shade and ornamental trees, fruit trees, trees suitable for windbreaks and lumber, are of interest to the dendrologist. There is a great diversity of flowering plants, grasses, ornamental shrubs and vines, vegetables and small fruits, each species being usually represented by a number of varieties. Manifold questions arise as to acclimatization, relations to insects and fungi, structural and physiological modifications due to new environment. The solution of such problems affords the botanist opportunity for the full exercise of his knowledge and ability.

The marine flora deserves special mention. The ancient Hawaiians used as food a great variety of seaweeds (*limu*), and carried on within the fish ponds a culture of certain species. The zonal distribution of these marine algae has not been studied as yet, and our numerous coral reefs still await detailed biologic investigation. The deep-sea regions immediately adjacent to the islands are, in general, unexplored.

The high mountain flora also merits scientific attention, for, although much of the systematic collecting of the past has been done in these regions, there is little work of an ecological nature. In such marked environments the ecological problems are of paramount interest.

III. Horticultural Conditions in Hawaii.

Hawaii is as unique in its horticulture as in its botany. The ancient Hawaiians had a highly developed intensive system of crop production that, although termed agriculture, was truly horticultural in its principles and practices. This

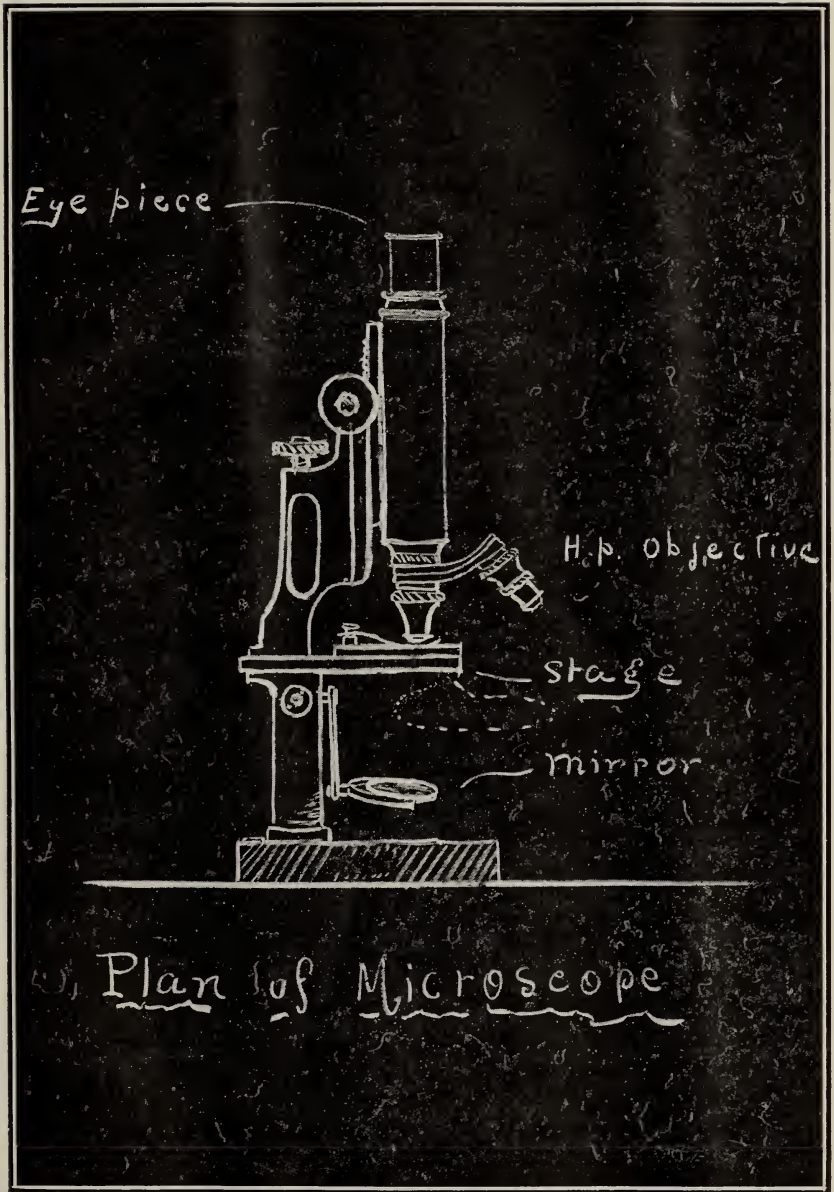


Fig. 2. BLACKBOARD SKETCH OF COMPOUND MICROSCOPE,
SHOWING ESSENTIAL PARTS.

is, unfortunately, decadent, and little survives but deserted taro patches, neglected groves of bananas, and slow dying cocoanut plantations, to tell of its extent and marvelous adaptation to local conditions. From all that can be learned at the present time, the ancient practices were highly commendable. Arable land and available water was utilized to a maximum degree. The Hawaiian, moreover, as has been already suggested, had a minute and exact knowledge of the varieties of food crops (ex. taro, sweet potatoes, bananas, etc.) and their cultural requirements. Much of this old knowledge could be profitably revived.

For example, the poor quality of the "Hawaiian" sweet potatoes commonly sold in the Honolulu markets is notorious, yet there are many delicious native varieties, some almost fruit-like in their fineness of texture and flavor.

Another profitable field for investigation is a study of the horticultural methods employed by the various nationalities that have come into the Territory. The generally-acknowledged skill of the Portuguese in raising grapes and figs; the ability that the Chinese vegetable gardener shows in exacting the utmost tribute from his land; the magic touch of the laborious Japanese, whereby mountain slopes, old taro patches, and erstwhile vacant lots blossom with a thousand fragrant flowers; all these are worthy of scientific study, for these peoples have solved many distinctly local horticultural problems.

The fruits which are now of commercial importance are pineapples, bananas (Chinese and Jamaica), avocados, and cocoanuts. Each of these needs much study to the end that they may be definitely adapted to Hawaiian conditions.

IV. Functions of the Department.

The above survey of local conditions reveals some of the many gaps in our knowledge of Hawaiian botany and horticulture. The functions of the Department of Botany and Horticulture are, of course, primarily to give cultural and practical training through the subject-matter comprehended by the title used. It also conducts research studies in these subjects, and presents facilities for graduate work therein.

Note that the primary function of the department is *training*. The keynote of the best education of today is The Ability to Do. All learning should result in the power to think correctly and to act wisely and skilfully. The training is gotten through specific contact with certain subject-matter. The young man who has taken a course in general botany should be able to scientifically attack a practical problem of plant life, and to arrive at certain verified conclusions, upon which definite action could be profitably based. This ability is the



Fig. 3. A "HARD-SHELLED" VARIETY OF PERSEA AVACADO, ESPECIALLY ADAPTED FOR LONG DISTANCE SHIPPING.

real test of education, and is the final demarcation between the civilized man and the savage. The attending of lectures, the participating in class discussions, the studying of the text-book and of reference-books, the performing of specific field and laboratory exercises—all these have as their pivotal point—their vital essence—the definite Training to Do. This Education for Service—the pith and strength of modern collegiate teaching, is often unnoticed by the casual observer of pedagogic methods.

V. The Courses.

The Department offers four regular courses in Botany, and three in Horticulture.

Each course is presented from a twofold viewpoint—first, the fundamental principles of the subject; second, the applications of these principles, especially as exemplified in Hawaii, and in similar tropical and subtropical countries. The courses are as follows:—

1. The Morphology and Physiology of Plants.
2. Systematic Botany.
3. Dendrology.
4. Elementary Bacteriology.
5. General Horticulture.
6. The Propagation of Plants.
7. Tropical and Subtropical Fruits.

VI. Equipment.

The equipment of the Department includes a lecture room seating fifty, standard laboratory apparatus and supplies (Fig. 1), a stereopticon, wall charts, collections of lantern slides, photographs, models and other illustrative material. The library is carefully chosen, and includes standard periodicals.

Two herbaria are gradually developing—one of typical species illustrating the Hawaiian flora, for taxonomic work; the other is a garden herbarium, to contain the species and varieties of cultivated plants.

The microscopical equipment is thorough and of the best quality, affording opportunity for advanced histological, pathological, and embryological work.

The Department has a very good set of field instruments, including photographic equipment, for use in botanical and biological survey work.

The engineering laboratory has a high-grade materials-testing department, and its work in timber-testing articulates with the course in dendrology.

VII. Lectures.

The point-of-view of the lectures has already been stated. Carefully-prepared lecture notes are required in all courses. They contain the lecture outlines, references, illustrative drawings (Fig. 2), etc. Study-guides are issued for each lecture, giving topical questions, assignments, references, and other aids to individual work. These notes are preserved and bound, forming a readily accessible digest of the subject-matter covered.

VIII. Laboratory and Field Work.

This work is a fundamental part of all courses. Carefully-made note-books are required, as credit is based to a considerable extent upon this work. A considerable portion of this work is afield, carried on out of doors. This field work is possible throughout the entire year, under especially extensive and satisfying conditions. There is, in the immediate vicinity of Honolulu, a remarkable variety of plant life, both indigenous and exotic; diversified horticultural industries; and several types of forest land.

The work for each laboratory exercise is outlined in a study-guide, similar to those accompanying the lectures. The Department is favored by the coöperation of several other scientific institutions in the city, to which places excursions are made on suitable occasions.

Field trips extending over periods of several days, and having as their purpose detailed biologic surveys of typical regions, will be organized from time to time.

IX. Recitations.

Ability to discuss intelligently the important topics of the course is required. This ability is of distinctive value, and is graded accordingly. Recitation work is based upon the other work of the course. Training is given in the correct oral presentation of well outlined subject-matter.

X. Library Reference Work.

In all courses occasional assignments of reference work are made. Such assignments require thoroughness and accuracy, and presentation in appropriate form. From time to time students are asked to present the results of their special assignments orally to the class concerned. Much of this work deals directly with Hawaiian conditions, thus closely relating the general subject-matter of the course to the peculiar problems of this Territory.

XI. Credit.

Grading is based upon—attendance, status of note-books, recitations and examinations; status of special assignments and collections; general deportment and attitude toward the work. Credit is not given for incomplete work. Tardy work is graded accordingly. All examinations must be taken. Credit for special work, and permission to take courses without credit, is arranged for by consultation.

XII. Special Work.

Students registered in any courses (except Botany 1 and 2, and Horticulture 1), may elect special subjects or problems as a part of their laboratory work. This choice is granted only to students in good standing, who show sufficient preparation and ability to advantageously carry on studies of an investigational nature.

XIII. Research Work.

In addition to its teaching functions, the Department investigates problems of specific interest and value.

An extensive study has been made of the various methods of preparing, staining, and otherwise treating woods for interior finishing, cabinet work, etc. A collection of such woods was made, samples were treated with various combinations of fillers, stains, polishes, varnishes, etc. Records were kept, and photographs made, and certain conclusions reached.

The preserving of fine fruits for exhibition purpose has been a largely unsolved problem for Hawaii. The Department has been, and is now, conducting a series of experiments to determine the proper preservatives for each kind of island fruit. It is a well-known fact among exhibitors that a liquid suitable, for example, for preserving tomatoes, will not be satisfactory for pineapples. The proper mixture must be determined empirically for each species. This is a laborious task, but when the formula is once attained, that particular problem is definitely solved. There are many calls from the mainland for exhibits of Hawaiian fruits, and the value of this work is potent. The Promotion Committee has kindly assisted in this investigation by the loan of certain exhibition glassware.

Nearly every yard in Honolulu has one or more palm trees therein—there are some seventy species in Hawaii—and yet very few people know the correct names of the palms. So a botanical survey is being made of the palms of Hawaii—photographs taken of the different species, literature searched, and material gathered, which will finally be printed, and thus made available for general use.

A survey of the vegetable garden industry in Hawaii is now in progress. Varieties of vegetables, soil and cultural conditions, transportation and marketing will be studied, and much valuable data is anticipated.

XIV. Graduate Work.

The Department is still so young that the offering of post-graduate work is chiefly a matter of the future. There are, however, facilities for individual research and investigation, and these opportunities are open to any who show ability to undertake work of an advanced character, and who have a bona fide purpose therein.

There are, as has already been shown, a great variety of unsolved local botanical and horticultural problems, well worth the attention of students and practical men. One kind of avacado, for example, has a very thick, leathery skin (Fig. 3), admirably adapting it for long-distance shipping. A careful study of this variety would doubtless result in valuable knowledge of distinct financial importance.

XV. The Morphology and Physiology of Plants.

This course consists of lectures, laboratory and field work, recitations, and library reference work. It is given in the first semester, and counts three credits. It is required of Science, Agriculture, and Household Economics Freshmen. This course, with course 2, covers the fundamental principles of general botany. It includes detailed studies of the shoot, leaves, root, structure and ontogeny of the plant cell, primary and secondary tissues, development of internal structure, the general conditions of plant life, and the great processes of nutrition, respiration, growth, movement, and reproduction.

The text required is *Principles of Botany*, by Bergan, and Davis, Strasburger, Kerner and Oliver, Coulter, and Beasey are the chief reference works. The laboratory exercises involve the use of simple and compound microscopes, performance of selected experiments, and formation of herbaria. Field work includes morphologic observations, and studies of plants in relation to environments.

XVI. Systematic Botany.

This course is organized in the same manner as Course 1. The same text-book is used. It is given in the second semester, and counts three credits. Required of Science, Agriculture, and Household Economics Freshmen.

A careful survey is made of the chief plant groups, with individual studies of distinctive types, and of plant evolution.

Special emphasis upon the flora of the Hawaiian Islands, and upon ecological and economic aspects. Each student makes a herbarium of typical plants for use in taxonomic work. Laboratory exercises upon selected types, and including the preparation of simple keys. Studies of representative plant societies, with field excursions. Reference books—Hillebrand, Engler and Prouth, and various tropical floras.

XVII. Dendrology.

Lectures, laboratory and field work, recitations, and library reference work. This course is given in the first semester, and counts two credits. Required of C. E. Seniors. A survey of the morphology and histological structure, classification, life histories, diseases and enemies of timber trees, from the standpoint of Hawaiian and North American forest conditions. Detailed studies of wood structure as affecting its uses in structural engineering, furniture making, interior finishing, paper and other pulp products. The physical, mechanical, and chemical properties of woods. Laboratory exercises upon the important trees of Hawaii, and of the world. Students will prepare keys to common woods. Excursions are made to several forest regions of Oahu, to timber-testing plants, lumber yards, mills, and forest nurseries. A thesis upon some important timber tree is required. Collections are made of wood samples and various forest products. Books chiefly used are: Publications of the National and Territorial Bureaus of Forestry; Gifford, Practical Forestry; Sargent, Manual of the Trees of N. A.; Brandis, Indian Trees.

XVIII. Elementary Bacteriology.

Lectures, recitations, laboratory and library work. Given in the first semester and counts three credits. Required of Science, Agriculture, C. E., and Household Economics Juniors. A resumé of the general field of bacteriology, emphasizing economic features, especially in relation to agricultural processes, and to public health. The laboratory work is organized to give training in standard methods of procedure, and studies of type forms. Each student prepares a set of slides illustrating representative micro organisms. Excursions are made to the laboratories in the city. Books chiefly used: Williams, Moore, Sternberg, Lehmann and Neumann, Conn, MacFarland, Eyre.

XIX. General Horticulture.

Lectures, laboratory and field work, recitations, and library reference work. First semester, counting three credits. Required of Agriculture Juniors. A careful study of the principles of horticulture, especially as exemplified by the best practices in

the United States mainland, in Hawaii and in Europe. The fundamental methods of fruit growing, vegetable gardening, floriculture, and landscape gardening. A study of local horticultural conditions, from the standpoint of the amateur, and of the commercial grower. Excursions to local regions of horticultural interest,—orchards, vegetable and flower gardens, fern houses, nurseries, parks, private estates, etc. Books chiefly used: Bailey, Principles of Fruit Growing, of Vegetable Gardening, Taft, Greenhouse Management; Maynard, Landscape Gardening; Bailey, Cyclopedia of American Horticulture.

XX. The Propagation of Plants.

Organization is the same as XIX. Second semester, counting three credits. Required of Agriculture Sophomores. A comprehensive study of the principles of plant production, and of those methods most applicable to the important fruits, flowers, and vegetables of Hawaii. A survey of the standard methods used in other horticultural regions. A special study of plant selection and breeding. Laboratory exercises in seed selection and testing, hybridization, care and planting of seeds, separation, division, layering, cuttage, budding and grafting. Occasional excursions to orchards, nurseries and similar localities. Text: Bailey, Nursery Book.

XXI. Tropical and Subtropical Fruits.

Lectures, laboratory and field exercises, recitations, and library reference work. Second semester, counting three credits. Required of Agriculture Juniors. A systematic study of important fruits,—description, distribution, varieties, propagation, planting, culture, fertilizing, spraying, harvesting, grading, packing, marketing and other commercial aspects. The fruits thus studied are: Pineapple; citrus fruits; grape; banana; apricot; peach; nectarine; mango; avacado; papaia; fig; date; olive; coconut and other tropical nuts; anonas; eugenias; breadfruit. General studies are made of fruit protection, processing, preservation, utilization of wastes. Laboratory studies of important species and varieties, with reference to botanical status, adaptations and commercial value. The preparation and application of standard spray mixtures. Excursions to fruit farms, orchards, canning factories, warehouses, etc. Text: Wickson, Fruits of California.

Through these channels the Department of Botany and Horticulture strives to meet the needs of the Territory of Hawaii,—growing needs, whose importance increases year by year.

KAHOOLAWE FOREST RESERVE.

Honolulu, T. H., June 23, 1910.

Board of Agriculture and Forestry, Honolulu, Hawaii:

Gentlemen:—I have the honor to bring before you for consideration the proposition of setting apart the Island of Kahoolawe as a forest reserve.

As the result of long years of overstocking, Kahoolawe has become locally a name practically synonymous with desolation and waste. The object of declaring the island a forest reserve is to put it in a position where, upon the expiration of the existing lease, effective steps could be taken toward its reclamation. It is true that to bring back a cover of vegetation over the whole island would require a long time and a considerable outlay of money; but not a little toward saving what remains can be accomplished through the complete removal of the live stock now on the island, so that what vegetation there is may be given a chance. This could be done at small cost. More elaborate plans can wait.

Administratively, the reclamation of Kahoolawe can best be accomplished if the island is in the control of the branch of the Territorial government that is equipped to undertake such work—the Board of Agriculture and Forestry. It is for this reason, and also that the public may know definitely the intentions of the government in regard to this piece of public land, that it is proposed to set Kahoolawe apart as a forest reserve. The proposal is made at this time at the suggestion and request of the Governor.

DESCRIPTION OF THE ISLAND.

Kahoolawe is the smallest of the eight islands making up the Hawaiian group. It lies to the southwest of Maui, about eight miles distant. The island is, roughly, about ten miles long by from two to seven miles broad; its area is 28,260 acres. The highest point is toward the east end, Puu Kahoolawe, elevation 1427 feet. Kahoolawe is visited by but few persons. When one does go, the trip is usually made by whaleboat or gasoline launch from Lahaina.

The Island of Kahoolawe consists of one government land, at present under an expiring lease held by Mr. Eben P. Low, that runs out on January 1, 1913. This lease was formerly held by Mr. C. C. Conradt, now of Pukoo, Molokai, and was transferred by him to Mr. Low a few years since. Prior to that time the island had passed through many hands. It has been used continuously for many years for the grazing of cattle, and especially of sheep. A great part of the time it

has been badly overstocked, a condition which has resulted in the destruction of the original cover of vegetation, followed by erosion and the loss of large quantities of valuable soil, much of which has literally been blown away to sea by the strong trade wind.

It is said by those who knew the island in former times that there used to be considerable forest on the higher land and a good cover of native grasses over the rest of the island. In recent years soil denudation has gone on so rapidly that now large areas have been eroded down to hard pan. These areas are constantly increasing in size, and it is much to be feared that unless the process is checked within a comparatively short time by far the larger part of the island will be reduced to a like condition. In many places are to be seen tall columns of soil protected by a bit of turf. These show the original depth of the soil, and serve as an index of the great quantity that has been lost.

In a few of the more sheltered gulches are scattering algaroba trees, and elsewhere on the island are remains of the oldtime growth. Relieved of the constant cropping of sheep, the young plants from these trees would help in bringing back better conditions.

REASONS FOR RECLAIMING KAHOO LAWE.

On general principles, it is evident that in "a community believing in conservation, such waste as is now going on on an island that was formerly as productive as was Kahoolawe, ought to be stopped. As erosion continues, the island becomes of less and less value to the people of the Territory, whereas were Kahoolawe to be effectively reclaimed it could in time again be made to be a valuable asset. Personally, I am not in favor of any large expenditure on Kahoolawe under the financial conditions that now obtain in Hawaii. There are a considerable number of localities throughout the Territory that deserve and should receive attention before the very limited funds at the disposal of the local government are drawn upon for Kahoolawe, except the comparatively small sum that may be needed to rid the island of animals that are not removed by the lessee at the expiration of the present lease. But I do distinctly believe that the island should be definitely withdrawn from the list of lands subject to lease and put into a class where, if the time does come when there are funds from any source that may appropriately be used for such work, more active steps toward its reclamation could at once be undertaken. This I believe can best be done by making Kahoolawe a forest reserve. And this is the main object of the proposal that it be so set apart.

A Subsidiary Argument.

Along with this main reason why Kahoolawe should be reclaimed there is a subsidiary claim that at least deserves mention. This is that an opportunity is afforded in the reclamation of Kahoolawe to secure data of great scientific interest in regard to the much-mooted question of the influence of a cover of vegetation in producing rainfall. There is much verbal testimony (but unfortunately few, if any, reliable instrumental records) that in former days, say twenty-five years ago and before, there were many light, drifting showers at the south end of East Maui, at Ulupalakua, which originated over Kahoolawe and drifted across the channel with the "Naulu" breeze. In recent years there is said to have been a perceptible diminution of these light rains, which in that dry district were of great value. This change is attributed to the destruction of the cover of vegetation on Kahoolawe. Whether this is true or not no man can positively say, but there seems enough reason for its being so to justify some expenditure in the way of restoring former conditions, provided that money for the experiment could be drawn from some special fund, not now in sight.

Under the peculiar conditions of climate obtaining in Hawaii, due to the situation of the islands in the trade-wind belt, it often happens that the several factors influencing precipitation are balanced with such extreme delicacy that a very slight alteration in any one is enough to set off far-reaching changes. Kahoolawe is decidedly a case in point. Here the problem can be studied almost as in a laboratory, for here, if anywhere, can human interference exercise an influence over one or more of the natural factors. Careful meteorological records, kept for a long series of years, are an essential part of such a study. It would not be an easy thing to do well. But the opportunity is an unusual one. Its possibilities should not be overlooked.

The results to be obtained from such an experiment may seem too remote from practical application to justify the required outlay to carry the work out properly as it should be done. But considered strictly from the standpoint of reclaiming the island that it may some time be put to a better use than is now possible, if Kahoolawe is definitely set apart, even though nothing more is done for some years than completely to remove the stock now thereon, the condition of the island can not but improve. Further, if set apart as a forest reserve, it will be ready for whatever other program of improvement may in the future seem desirable.

Should the artificial restoration of vegetation on Kahoolawe come later to be undertaken, it should be as the result of a comprehensive and systematic study of the problem, em-

bodied in a detailed plan for planting. It is unnecessary to discuss this matter here further than to say again that the first step in any plan must necessarily be the total removal from the island of all cattle, sheep and goats. The reclamation of Kahoolawe will be anything but an easy task, but I believe it is possible.

RECOMMENDATION.

For the reasons given above I do therefore now recommend that the entire Island of Kahoolawe, in the County of Maui, Territory of Hawaii, be set apart as a forest reserve, to be called the "Kahoolawe Forest Reserve."

If the Board of Agriculture and Forestry approve this proposal, I would suggest that the members so signify and that the Board request the Governor to call and hold the required hearings, and thereafter to set apart this island as the Kahoolawe forest reserve.

Very respectfully,

RALPH S. HOSMER,
Superintendent of Forestry.

FOREST RESERVE HEARING.

KAHOOLAWE.

Minutes of a public hearing re the creation of the Kahoolawe Forest Reserve, and the setting apart of certain lands in the Hilo, the Kau, and the Hamakua-Pali Forest Reserves on Hawaii and the Ewa Forest Reserve on Oahu, held by the Governor of the Territory and the Board of Commissioners of Agriculture and Forestry, in the office of the Board at the Government Nursery, on Saturday, August 20, 1910, at 10 o'clock a. m.

Present: Governor Walter F. Frear; Mr. Marston Campbell, President and Executive Officer of the Board; Mr. Alonzo Gartley, representing C. Brewer & Co.; Mr. Allan Herbert; Mr. Ralph S. Hosmer, Superintendent of Forestry; Mr. David Haughs, and Mr. H. E. Walker, reporter for the Evening Bulletin.

The Governor opened the hearing with the statement that its purpose was to consider the proposition of setting apart the Island of Kahoolawe as a forest reserve, in accordance with notices duly published in the Pacific Commercial Advertiser and the Hawaii Herald, as requested by law.

At the request of the Governor, Mr. Campbell read from the minutes of the meeting of July 20, 1910, the action taken by the Board of Agriculture and Forestry in regard to Ka-

hoolawe. He stated that the report of the Superintendent of Forestry on this matter was given in full to the press at that time for publication.

The Governor asked if there was anything of a personal character that should be read at this meeting.

Mr. Hosmer said that the gist of the matter is that the Island of Kahoolawe has for many years been overstocked and has suffered from overgrazing by cattle and sheep. It is desired to bring it back to a condition of some value to the Territory. The most effective method of doing so seems to be to set it apart as a forest reserve that it may come under the control of the Territorial Department best equipped for such work—the Board of Agriculture and Forestry. Incidentally, and as a minor consideration, there is afforded a very interesting chance to secure data in regard to the possible effect of reforestation on the local climate.

The Governor asked if anyone had anything to say for or against the proposition in addition to what had already been presented.

Mr. Hosmer stated he had invited Mr. Eben Low to be present at this hearing, and also personally notified other persons likely to be interested.

Mr. Hosmer further stated that some time ago, when he was on the Island of Molokai, he had had considerable talk with Mr. C. C. Conradt, predecessor to Mr. Low as lessee of Kahoolawe, who was decidedly in favor of the reservation of the Island.

The Governor asked if the Legislature had not passed a resolution on this subject—a concurrent resolution. The Journal of Proceedings of the House of Representatives of the Fifth Legislature of the Territory of Hawaii being produced, the Governor read the following paragraph from the report of the Committee on Agriculture, Forestry, Promotion and Immigration (pages 868 and 869):

“And Be It Further Resolved, That it is the opinion of this Legislature that the Board of Agriculture and Forestry should, during the next biennial period, use every effort possible to accomplish the reforestation of those portions of the Territory where the former forests have died out or been destroyed, more especially in the Kohala mountains on the Island of Hawaii, where large irrigation ditches are conveying the waters gathered from the watershed into the Districts of Kohala and Hamakua; that it favors the establishment of substations by the Board on each Island, to be used as nurseries for young trees, and as distributing centers; and it strongly recommends that the Board have translated into the Hawaiian language and distributed to such persons who are interested, the bulletins issued by the Board from time to time respecting agriculture, animal industry and entomology.

which may be beneficial to its citizens; that it urges upon the Board the advisability of expending the sum of Five Thousand Dollars, or so much thereof as may be necessary, for the sinking of artesian wells at Kapiolani Park, and it recommends that the Board require each of its bureau heads to visit each Island of the Territory at least once every six months, or as often as the Board shall find practicable, for the purpose of imparting technical information directly to such of the native Hawaiians and other persons as are interested.

"And Be It Further Resolved, That it is the opinion of this Legislature that the Island of Kahoolawe should not be leased upon the termination of the existing lease, but that every effort should be made by the proper authorities for the killing of all animal life upon said Island and for the improvement and restoration of the plant life thereon."

The Governor asked Mr. Gartley if he had anything to say on this subject.

Mr. Gartley said that he had no definite statement to make except that he was in favor of making Kahoolawe a reserve. "It is a curious thing," he continued, "the way the heavy channel clouds hang in that vicinity: the climate has undergone a decided change, and it is reasonable to suppose that Kahoolawe has suffered from this change." From a talk he had had recently with Mr. Low, he did not believe that gentleman desired to renew his lease.

The Governor said that naturally the Island is not worth a great deal in its present condition, as it produces little or nothing. If it is kept on being leased, it will produce less and less as time goes on.

Mr. Gartley said that the entire top dressing of soil is being rapidly removed.

The Governor said that he, with Mr. Campbell and Mr. F. H. Newell of the U. S. Reclamation Service, had been all over the Island on horseback, and that Mr. Newell had stated that, although he had seen much of the arid lands of the West, he had never seen anything to compare with this Island for devastation. Kahoolawe is recoverable, but it will take a long while. The top of the Island was once composed of from four to ten feet of good soil. This has been completely swept off down to hardpan, and it will take some time to bring it back. Some of the slopes of the Island are not very greatly changed perhaps, but the soil is gone. However, there are many spots covered with Pele grass, and down lower are scattered algarobas.

In answer to Mr. Gartley's question, "What do you propose to do?" the Governor said the first thing to be done is to clear off all sheep and goats, and then it is for the Board of Agriculture and Forestry to discover some suitable plants.

Mr. Campbell said we may have to come down to lantana, as that is the best cultivator we have—it is a good reclaiming plant. The algaroba and the lantana might be taken to that Island and in twenty years might cover it. We want something that will spread and reseed itself. A cover of vegetation is a question of time.

Mr. Hosmer said it is very largely a question of expense; there are numbers of plants that could be used and that would do well were they once started.

The Governor said that steps should be taken immediately, even before the present lease expires, to install suitable rain gages and to get gage records. It is even more important to get these now than it is for the first few years afterward.

In response to a question by Mr. Gartley in regard to the number of sheep on the Island, the Governor answered that there are in the neighborhood of fifteen hundred, and about as many goats.

The Governor instructed the Superintendent of Forestry to write to Mr. Newell and to Mr. Leighton to ascertain their ideas as to what should be done.

Mr. Allan Herbert stated that in 1871 he traveled all over the Island in question and the vegetation was then abundant there. It was his idea that there was nothing better to plant than the lantana, as this grows excellently and helps the soil. "Lantana was planted some forty years ago on the devastated portions of Ceylon, and today you will see kiawes growing and hundreds of animals browsing there. Lantana did it all. It digs its roots down and spreads rapidly. The decomposed rock makes the soil. It suggests itself to me that a wind-break is one of the principal things to have. I am sure that the work you are doing will live after you, and if I can assist you in any way, I shall be glad to do so without remuneration."

The Governor stated that this Island ought to be set apart as recommended, and stated that he was ready to sign a proclamation to that effect.

THE SETTING APART OF CERTAIN LANDS IN FOREST RESERVES ON HAWAII AND OAHU.

With reference to the other matter in the call for the hearing, the setting apart of certain lands in the existing forest reserves on Hawaii and Oahu, Mr. Hosmer said that as the forest reserve law was originally enacted, in 1903, it provided that only lands could be set apart that were not under lease, or on which the lease had less than two years to run. A number of the forest reserves first to be created accordingly included government lands within their boundaries that could not be technically set apart. In 1907, the law was so amended

as to permit the setting apart of any government lands as forest reserves, whether under lease or not, subject, of course, to the rights under existing leases. The object of the present move was to transfer into the technically reserved class lands within certain of the older forest reserves that had never been formally set apart. This action in nowise changes the established boundaries of those reserves; it merely gives official status to lands that have popularly been considered as already reserved. The lands in question are in the Hilo, the Kau, and the Hamakua-Pali Forest Reserves on Hawaii, and the Ewa Forest Reserve on Oahu. Similar action to that now recommended, establishing a precedent, was taken during Governor Carter's administration, when lands in the Koolau and the Hana Forest Reserves on Maui were thus technically set apart. "For these reasons," said Mr. Hosmer, "I now recommend that these lands be technically, formally and legally set apart."

Mr. Hosmer submitted his report, which had been approved by the Board of Commissioners of Agriculture and Forestry. This gives a list of the lands.

Mr. Campbell said he appeared for the setting apart of these lands, inside of the existing and established boundary lines. The purpose is to give a legal status where one does not now exist.

Mr. Gartley said he understood that the company, he represented C. Brewer & Co., considered that both their interest and the interests of the public would be well conserved by such a movement.

The Governor stated that as there seemed to be no objection to this action, if Mr. Hosmer would prepare the necessary proclamation he would sign it.

As there was nothing further to come before the meeting, it was declared adjourned.

Very respectfully,

RALPH S. HOSMER,
Superintendent of Forestry.

REPORT ON RICE AND COTTON INVESTIGATIONS IN CHINA AND JAPAN.

BY F. G. KRAUSS.

(Concluded, from August issue.)

APPENDIX.

References to publications of Colleges of Agriculture and Agricultural Experiment Stations of Japan on rice investigations and related subjects (up to 1909):

Bulletins of the College of Agriculture, Imperial Univer-

sity of Tokyo, Komaba, Japan:

Manuring Experiments with Paddy Rice, 1889-1894. Vol. I. Bulls. 8-11 (1889-'91). Vol III., pp. 371-406 (1891-'94).

Analysis of Nine Japan Rices and other Data, Vol. I., Bull. 12.

On the Consumption of Water in Rice Fields, Vol III., pp. 407-415.

On the Number of Rice Shoots per Clump in Transplanting, Vol. III., pp. 415-420.

On "The Salt Water Selection" Method of Seeds, Vol. III., pp. 421-439.

On the Effect of Steeping Rice Seeds, Vol. III., pp. 469-473.

On the Absorption of Water by Rice Seed, Vol. III., pp. 474-475.

On the Specific Gravity of Rice Seedlings in Different Stages of Ripening, Vol. III., pp. 479-481.

On the Development of the Plumule and Radicle of Rice Seed With Various Quantities of Water in the Germinating Medium, Vol. III., pp. 482-487.

Über die Bestimmung von Humus in der Ackererde, Vol. IV., pp. 237-240.

Über die Aufnahme von Stickstoff und Phosphorsaure durch Verschiedene Kulturpflanzen in Drei Vegetationsperioden, Vol. IV., pp. 241-254.

On the Influence of Different Ratios of Lime and Magnesia Upon the Development of Plants, Vol. IV., pp. 361-370.

To What Extent Should a Soil Be Limed? Vol. IV., pp. 371-379.

The Lime Factor for Different Crops, Vol IV., pp. 381-385.

On the Action of Manganese Compounds on Plants, Vol. V., pp. 161-172.

On the Physiological Influence of Manganese Compounds on Plants, Vol. V., pp. 177-185.

On the Action of Sodium Fluorid upon Plant Life, Vol. V., pp. 188-198.

On Oxidizing Enzyms in the Vegetable Body, Vol. V., pp. 207-235.

On the Different Forms of Lime in Plants, Vol. V., pp. 239-242.

On the General Occurrence of *Bacillus Methylicus* in the Soil, Vol V., pp. 255-258.

Der Erntegustent, Vol. V., pp. 459-460.

On the Stimulating Action of Manganese upon Rice, Vol. V., pp. 467-472.

On the Behavior of the Phosphoric Acid in the Soils Towards Different Organic Acids, Vol. V., pp 506-508.

On the Influence of Different Ratios of Lime to Magnesia on the Growth of Rice, Vol. VI., pp. 97-102.

On the Practical Application of Manganus Chlorid in Rice Culture, Vol. VI., pp. 131-133.

On the Stimulating Action of Manganese upon Rice, II., Vol. VI., pp. 135-6.

On the Treatment of Crops by Stimulating Compounds, Vol. VI., pp. 161-175.

On the Influence of Liming upon the Action of Phosphatic Manures, Vol. VI., pp. 195-214.

On the Action of Various Insoluble Phosphates upon Rice Plants, Vol. VI., pp. 215-261.

On the Effects of Soil Ignition upon the Availability of Phosphoric Acid for Rice Culture in Paddy Fields, Vol. VI., pp. 253-276.

On the Organic Compounds of Phosphoric Acid in the Soil, Vol. VI., pp. 277-284.

On the Behavior of the Rice Plant to Nitrates and Ammonium Salts, Vol. VI., pp. 285-294.

On the Different Degrees of Availability of Plant Nutrients, Vol. VI., pp. 335-346.

On the Injurious Effects of an Excess of Lime Applied to the Soil, Vol. VI., pp. 347-351.

Can Nitrite Provide Oxygen in Anaerobic Culture of Bacteria? Vol. VI., p. 403.

On Manuring with Kainit, Vol. VI., pp. 405-

On the Influence of Various Ratios of Phosphoric Acid to Nitrogen, Vol. VI., pp. 422-428.

Is Germination Possible in the Absence of Air? Vol. VI., pp. 439-442.

On the Influence of the Reaction of the Manure upon the Yield, Vol. VII., pp. 39-46.

On the Manurial Value of Calcium Cyanide, Vol VII., pp. 47-52.

The Efficiency of Calcium Cyanide Under Different Conditions, Vol. VII., pp. 53-55.

Regeneration of Overlimed Soil, Vol. VII., pp. 61-65.

The Manurial Value of Different Potassium Compounds for Barley and Rice, Vol. VII., pp. 67-72.

On the Stimulating Action of Manganese upon Rice, III., Vol. VII., pp. 76-81.

On the Formation of Humus, Vol. VII., pp. 95-99.

On Physiologically Balanced Solutions, Vol. VII., pp. 395-409.

Studies on Humus Formation, II., Vol. VII., pp. 419-423.

Does Any Organic Silica Compound Occur in Plants? Vol. VII., pp. 429-431.

Can Calcium Carbonate Cause Loss of Ammonia by Evaporation from the Soil? Vol. VII., pp. 433-439.

Relation of Plant Growth to Root Space, Vol VII., pp. 437-439.

On the Physiological Effects of an Excess of Magnesia upon Barley, Vol. VII., pp. 441-2.

On the Changes of Availability of Nitrogen in Soil, I., Vol. VII., pp. 443-448.

On the Continuous Application of Manganous Chloride in Rice Culture, II., Vol. VII., pp. 449-453.

Observations on Stimulation of Plant Growth, Vol. VII., pp. 455-456.

On the Different Forms of Phosphoric Acid in Press Cake, Vol. VII., pp. 457-459.

Über die Verbreitung von "Anhydro-Oxy-Methylen diphosphorsäuren Salzen" oder "Phytin" in Pflanzen, Vol. VII., pp. 495-502.

Über ein Enzym "Phytose," das "Anhydro-oxy-methylen diphosphorsäure" Spalten, Vol. VII., pp. 503-512.

Studies on Humus Formation, III., Vol. VII., pp. 514-529.

On the Changes of Availability of Nitrogen in Soils, II., Vol. VII., pp. 567-574.

On the Absorption of Varying Amounts of Lime and Magnesia by Plants, Vol. VII., pp. 579-581.

Gypsum as a Manure Vol. VII., pp. 583-597.

On the Depression of Growth by Large Doses of Lime, Vol. VII., pp. 599-612.

On the Composition of Rice Straw, Vol. VII., pp. 619-621.

Reference in the Journal of the College of Agriculture. Imperial University of Japan.

Researches on the Preservation of Night Soil, Vol I., No. 2, pp. 146-151.

On the Manurial Value of Various Organic Phosphoric Compounds, Vol. I., No. 2, pp. 153-161.

On the Availability of Phosphoric Acid in Various Forms in Herring Guano, Vol. I., No. 2, pp. 163-165.

On the Different Forms of Phosphoric Acid in Organic Manures, Vol. I., No. 2, pp. 167-170.

On the Influence of Different Ratios of Lime to Magnesia on the Growth of Rice, Vol. I., No. 2, pp. 171-173.

On the Influence of the Ratio of Lime to Magnesia upon the Yield in San Cultures, Vol. I., No. 2, pp. 175-180.

Is Artificial Calcium Carbonate More Effective than Limestone Meal? Vol. I., No. 2, pp. 181-2.

On the Application of Dicyanidiamide as a Nitrogenous Manure, Vol. I., No. 2, pp. 193-196.

Some Improvements in San Cultures, Vol I., No. 2, pp. 197-201.

Secondary Calcium Phosphate as a Manure, Vol. I., No. 2, pp. 203-206.

On the Differences of Susceptibility of Plants to Stimulants, Vol. I., No. 2, pp. 207-210.

On Manuring With Dicyandiamide, Vol. I., No. 2, pp. 211-222.

Is Dipotassium Sulphate Physiologically Acid? Vol. I., No. 2, pp. 223-225.

References in the Bulletins of the Imperial Central Agricultural Experiment Station.

On the Influence of Calcium and Magnesium Salts on Certain Bacterial Action, Vol. I., No. 1, pp. 1-16.

On the Application of Magnesia in the Form of Magnesium Sulphate for the Needs of the Rice Plant, Vol. I., No. 2, pp. 23-29.

On the Improvement of a Soil Relatively Deficient in Magnesia, Vol. I., No. 1, pp. 30-34.

On the Behavior of Nitrate in Paddy Soils, Vol. I., No. 2, pp. 7-36.

Influence of Stimulating Compounds upon the Crops Under Different Conditions, Vol. I., No. 2, pp. 37-39.

On Manuring With Magnesium Sulphate, Vol. I., No. 2, pp. 81-86.

On the Influence of Solubility on Availability, Vol. I., No. 2, pp. 93-104.

Some Observations on Manuring With Bone Dust, Vol. I., No. 2, pp. 105-120.

On the Cultivation of *Astragalus Loloides*, Vol. I., No. 2, pp. 121-123.

References for Practices in Pot Cultures.

Anwendung künstlicher Düngemittel, von Dr. Paul Wagner. Price 2 M. 50 Pf.

Düngungsfragen unter Berücksichtigung neuer Forschungsergebnisse. von Dr. Paul Wagner.

"How to Kill and Bleed Market Poultry" is the title of a circular issued in August by the Bureau of Chemistry, Department of Agriculture. All who raise poultry for the provision market should have it. The importance of the subject is shown in the following extract from the circular: "At least 30 per cent. of all the poultry coming into the New York market is incompletely bled. Much of it is so badly bled that it results in a loss of from two to five cents a pound, as compared with the corresponding poultry which is well bled and in good order. Aside from the bad appearance of incompletely bled chickens, their keeping properties are very inferior. The flesh loses its firmness sooner; its flavor is not so good; the odor of stale flesh and finally of putrefaction comes sooner, and in every way the product is more perishable." While it is true that in Honolulu poultry is bought alive by the dealers, the demand for poultry from raisers at a distance will probably, at no distant day, become so great

that a change of system will be necessary. Refrigerator shipments by the inter-island steamers and by rail will come into vogue, and it will then be important that the killing and dressing be done right. Perhaps, under the live poultry marketing system, some of the dealers require instruction in the matter.

Agriculturists everywhere will be interested in the following dispatch from Sheffield, England, under date of September 5: "At today's meeting of the British Association, Dr. Russell and Dr. Hutchinson, who have long been experimenting in soil fertility, announced the discovery of the micro-organism which destroys the bacteria essential to the fertility of the soil. A subsequent speaker declared that it was the most important agricultural discovery made in fifty years."

Mr. Clarence G. White, of Haiku, Maui, in a note to the editor, says: "I have seen hairy (woolless) sheep on the Isle of Pines, and a neighbor in Florida had a flock of twenty or so. The stock was brought in by a sea captain—from Barbados, if I remember rightly. The points claimed for them were that they stood the heat better, and grew flesh instead of wool, and were prolific. Sometimes the young lambs showed wool, but it disappeared later. My neighbor later decided that wool was worth having, and ceased to breed this sort."

Horse breeders and buyers should possess themselves of a recent circular of the Bureau of Animal Industry, Department of Agriculture, Washington, entitled "The Regeneration of the Morgan Horse." All who can recall the times of forty to fifty years ago know how the Morgan breed of horses was then esteemed. Its degeneration began, as the circular shows, when Morgan breeders were carried away by the speed craze. Linsley, in a book on Morgan horses published in 1857, gave warning of the mistake. Among other things he said: "The general business qualities of the Morgan are what give him his great value. His admirable traveling gait and his stoutness, courage and endurance are what is wanted for the road. It is not wise, therefore, to attempt to make him the fastest horse in the world, for in doing this we shall be very likely to lose sight of qualities far more important than the ability to trot a mile in 2 minutes 30 seconds." What was feared is what happened, but now the Department of Agriculture proposes to bring back the good old Morgan type, described in the American Farmers' Encyclopedia, published in 1844 in Philadelphia, as "perhaps the very finest breed of horses in the United States, when general usefulness is taken into consideration."

ADDITIONS TO FOREST RESERVES ON HAWAII AND OAHU.

PROCLAMATION OF THE RESERVATION OF CERTAIN LANDS IN THE HILO, THE KAU AND THE HAMAKUA-PALI FOREST RESERVES, ISLAND AND COUNTY OF HAWAII, AND IN THE EWA FOREST RESERVE, ISLAND OF OAHU, TERRITORY OF HAWAII.

Under and by virtue of the authority vested in me by the provisions of Chapter 28 of the Revised Laws of Hawaii, as amended by Act 65 of the Session Laws of 1905, and by Act 4 of the Session Laws of 1907, and of every other power me hereunto enabling, I, WALTER F. FREAR, Governor of Hawaii, with the approval of a majority of the Board of Commissioners of Agriculture and Forestry, having held the hearing of which notice has been duly given as in said acts provided, do hereby set apart as integral parts respectively of the Hilo, the Kau and the Hamakua-Pali Forest Reserves on the Island of Hawaii, and of the Ewa Forest Reserve on the Island of Oahu, Territory of Hawaii, the government land named below:

In the Hilo Forest Reserve I do hereby set apart as integral parts of that Reserve those certain portions of the tracts of government land known as Humuula, 3,901 acres, more or less, Kahoahuna, 46 acres, more or less, Waikaumalomaulua, 790 acres, more or less, Opea-Peleau, 230 acres, more or less, Kamaee-Wailua, 930 acres, more or less, Wailea-Kaiwika, 3,834 acres, more or less, Piha, 3,780 acres, more or less, Pihihouna, 33,941 acres, more or less, that lie within the boundaries of the Hilo Forest Reserve, in the District of Hilo, Island and County of Hawaii, Territory of Hawaii, created and approved by proclamation of Acting Governor A. L. C. Atkinson, under the date of July 24, 1905, which said proclamation gives the metes and bounds of said Hilo Forest Reserve, the same being more particularly described by and on a map now on file in the office of the Territorial Survey Department in Honolulu, marked "Registered Map No. 2060," and a description accompanying the same, numbered "C. S. F. 1629," altogether an area of 47,452 acres, more or less;

In the Kau Forest Reserve I do hereby set apart as integral parts of that Reserve those certain portions of the tracts of government land known as Moaula-Kopu-Makaka Mauka, 46.40 acres, more or less, Puu-makaa-Kiolakaa Forest, 5,750 acres, more or less, Waiohinu, 10,740 acres, more or less, Kaalaala-Makakupu Forest, 7,122 acres, more or less, that lie within the boundaries of the Kau Forest Reserve, in the District of Kau, Island and County of Hawaii, created and approved by proclamation of Governor George R. Carter, under the date of August 2, 1906, which said proclamation gives the metes and bounds of said Kau Forest Reserve, the same being more particularly described by and on a map now on file in the office of the Territorial Survey Department in Honolulu, marked "Registered Map No. 2361," and a description accompanying the same, numbered "C. S. F. 1722," altogether an area of 23,658.40 acres, more or less;

In the Hamakua-Pali Forest Reserve I do hereby set apart as an integral part of that Reserve that certain portion of the tract of government land known as Waimanu, 200 acres, more or less, that lies within the boundaries of the Hamakua-Pali Forest Reserve, in the District of Hamakua, Island and County of Hawaii, Territory of Hawaii, created and approved by proclamation of Governor George R. Carter, under the date of December 23, 1904, which said proclamation gives the metes and bounds of said Hamakua-Pali Forest Reserve, the same being more particularly described by and on a map now on file in the office of the Ter-

ritorial Survey Department in Honolulu, marked "Registered Map No. 2060," and a description accompanying the same, numbered "C. S. F. 1535;"

In the Ewa Forest Reserve I do hereby set apart as an integral part of that Reserve that certain portion of the tract of government land known as Aiea, 383 acres, more or less, that lies within the boundaries of the Ewa Forest Reserve, in the District of Ewa, City and County of Honolulu, Island of Oahu, Territory of Hawaii, created and approved by proclamation of Acting Governor A. L. C. Atkinson, under the date of March 9, 1906, which said proclamation gives the metes and bounds of the said Ewa Forest Reserve, the same being more particularly described by and on a map now on file in the office of the Territorial Survey Department in Honolulu, marked "Registered Map No. 2374" and a description accompanying the same, numbered "C. S. F. 1656."

IN WITNESS WHEREOF, I have hereunto set my hand and caused the Great Seal of the Territory of Hawaii to be affixed.

Done at the Capitol in Honolulu this 25th day of August, A. D. 1910.

W. F. FREAR,
Governor of Hawaii.

By the Governor:

E. A. MOTT-SMITH,
Secretary of Hawaii.

KAHOOLAWE FOREST RESERVE.

PROCLAMATION OF FOREST RESERVE ON THE ISLAND OF KAHOOLAWE, COUNTY OF MAUI, TERRITORY OF HAWAII.

Under and by virtue of the authority vested in me by the provisions of Chapter 28 of the Revised Laws of Hawaii, as amended by Act 65 of the Session Laws of 1905, and by Act 4 of the Session Laws of 1907, and of every other power me hereunto enabling, I, WALTER F. FREAR, Governor of Hawaii, with the approval of a majority of the Board of Commissioners of Agriculture and Forestry, having held the hearing of which notice has been duly given as in said acts provided, do hereby set apart as a Forest Reserve, to be called the Kahoolawe Forest Reserve, the entire Island of Kahoolawe, the same being the government land of Kahoolawe, in the County of Maui, Territory of Hawaii, and containing an area of 28,260 acres; more particularly described by the Survey Department of the Territory of Hawaii, as the Island of Kahoolawe, one of the islands on the Maui section of the Hawaiian Islands, of which the highest point has an altitude of 1427 feet and is in geographical position Latitude North 20° 34' 4.77" and Longitude West 156° 35' 21.06", as shown on a map made by the said Government Survey Department of the Territory of Hawaii, which said map is now on file in the said Survey Department marked "Government Survey Registered Map No. 1272"; area 28,260 acres.

IN WITNESS WHEREOF, I have hereunto set my hand and caused the Great Seal of the Territory of Hawaii to be affixed.

Done at the Capitol in Honolulu this 25th day of August, A. D. 1910.

W. F. FREAR,
Governor of Hawaii.

By the Governor:

E. A. MOTT-SMITH,
Secretary of Hawaii.

Office: Brewer Building, Queen St.
Works Iwilei,

Telephone 430.
Telephone 272.

The Hawaiian Fertilizer Co., Ltd.

HONOLULU, HAWAII.

MANUFACTURE AND DEAL IN ALL KINDS OF
Fertilizer and Fertilizer Ingredients
INCLUDING :

Bone Meal,	Sulfate Ammonia,
Nitrate Soda,	Sulfate Potash,
Double-Superphosphate,	Dissolved Guano,
Ground Limestone, etc., etc.	

BOARD OF DIRECTORS :

Chas. M. Cooke, President,	E. F. Bishop, Treasurer,
E. D. Tenney, Vice-President,	J. Waterhouse, Secretary,
Geo. H. Robertson, Auditor,	
W. M. Alexander	
C. H. Atherton,	
E. F. Bishop, Managing Director,	
Norman Watins, General Superintendent	

The products of this company are equal in every respect to any fertilizers sold in any market. In none of the conditions are they ranked by those manufactured elsewhere.

We will be pleased to furnish analysis of the soil of any locality in the Territory and make special fertilizers for different soil products arranging the composition to suit conditions.

Prices and Terms on Application.



Anyone sending a sketch and description may quickly ascertain our opinion free whether an invention is probably patentable. Communications strictly confidential. HANDBOOK on Patents sent free. Oldest agency for securing patents. Patents taken through Munn & Co. receive special notice, without charge, in the

Scientific American.

A handsomely illustrated weekly. Largest circulation of any scientific journal. Terms, \$3 a year; four months, \$1. Sold by all newsdealers.

MUNN & Co. 361 Broadway, New York
Branch Office, 625 F St., Washington, D. C.

Garden and Farm Tools and Implements

To do good farming you must have up to date tools to work with. We carry a most complete line of everything needed by the small or large farmer, from the smallest hand trowel to the largest cane plow. We also have a good assortment of Hand, Bucket or Barrel Sprayers. Our assortment of Hoes, Shovels, Spades, Mattocks, Rakes, Garden Shears, Lawn Mowers, Garden Hose, and other things that are needed daily about the farm or garden, is most complete and our stock large.

E O. HALL & SON, LTD.

Board of Agriculture and Forestry.

PUBLICATIONS FOR DISTRIBUTION.

Any one or all of the publications listed below (except those marked *) will be sent to residents of this Territory, free, upon application to Mailing Clerk, P. O. Box 331, Honolulu.

BOARD.

- Report of the Commissioner of Agriculture and Forestry for 1900; 66 pp.
Report of the Commissioner of Agriculture and Forestry for 1902; 88 pp.
* First Report of the Board of Commissioners of Agriculture and Forestry, from July 1, 1903, to December 31, 1904; 170 pp.
Second Report of the Board of Commissioners of Agriculture and Forestry, for the year ending December 31, 1905; 240 pp.; 8 plates; 10 text figures.
Third Report of the Board of Commissioners of Agriculture and Forestry, for the year ending December 31, 1906; 212 pp.; 3 plates; 4 maps; 7 text figures.
Fourth Report of the Board of Commissioners of Agriculture and Forestry, for the calendar year ending December 31, 1907; 202 pp.; 7 plates.
Fifth Report of the Board of Commissioners of Agriculture and Forestry, for the calendar year ending December 31, 1908; 218 pp.; 34 plates.
"Notice to Importers," by H. E. Cooper; 4 pp.; 1903.
"Digest of the Statutes Relating to Importation, Soils, Plants, Fruits, Vegetables, etc., into the Territory of Hawaii." General Circular No. 1; 6 pp.
"Important Notice to Ship Owners, Fruit Importers and Others. Rules and Regulations Prohibiting the Introduction of Certain Pests and Animals into the Territory of Hawaii." General Circular No. 2; 3 pp.; 1904.
"Law and Regulations, Importation and Inspection of Honey Bees and Honey." General Circular No. 3; 7 pp.; 1908.
"The Hawaiian Forester and Agriculturist," a monthly magazine. Vols. I to VI; 1904-1909. To be obtained from the Hawaiian Gazette Co., Honolulu. Price \$1 a year.

DIVISION ON ENTOMOLOGY.

- "The Leaf-Hopper of the Sugar Cane," by R. C. L. Perkins. Bulletin No. 1; 38 pp.; 1903.
** "A Catalogue of the Hemipterous Family Aleyrodidae," by G. W. Kirkaldy, and "Aleyrodidae of Hawaii and Fiji with Descriptions of New Species," by Jacob Kotinsky. Bulletin No. 2; 102 pp.; 1 plate; 1907.
* "On Some Diseases of Cane Specially Considered in Relation to the Leaf-Hopper Pest and to the Stripping of Cane," by R. C. L. Perkins. Press Bulletin No. 1; 4 pp.; 1904.
"A Circular of Information," by Jacob Kotinsky. Circular No. 1; 8 pp.; 1905.
"The Japanese Beetle Fungus," by Jacob Kotinsky and B. M. Newell. Circular No. 2; 4 pp., cut; 1905.
Report of the Division of Entomology, for the year ending December 31, 1905. Reprint from Second Report of the Board; 68 pp.; 3 plates; 10 text figures.
Report of the Division of Entomology, for the year ending December 31, 1906. Reprint from Third Report of the Board; 25 pp.; 7 text figures.
Report of the Division of Entomology, for the year ending December 31, 1907. Reprint from Fourth Report of the Board; 18 pp.; 1 plate.
Report of the Division of Entomology, for the year ending December 31, 1908. Reprint from Fifth Report of the Board; 26 pp.; 2 plates.

DIVISION OF FORESTRY.

- * "Forest and Ornamental Tree Seed for Sale at Government Nursery." Press Bulletin No. 1; 3 pp.; 1905.
* "Suggestions in Regard to the Arbor Day Tree Planting Contest." Press Bulletin No. 2; 7 pp.; 1905.
"An Offer of Practical Assistance to Tree Planters." Circular No. 1; 6 pp.; 1905.
"Revised List of Forest and Ornamental Tree Seed for Sale at the Government Nursery." Press Bulletin No. 3; 4 pp.; 1906.
* "Instructions for Propagating and Planting Forest Trees." Press Bulletin No. 4; 4 pp.; 1906.
"Instructions for Planting Forest, Shade and Ornamental Trees." Press Bulletin No. 5; 7 pp.; 1909.
"Na Hoakaka no ke Kanu Ana i na Laau Malumalu ame na Laau Hoohiwaahiwa." Press Bulletin No. 6; 8 pp.; 1909.
Report of the Division of Forestry, for the year ending December 31, 1905. Reprint from Second Report of the Board; 77 pp.; 5 plates.
* Report of the Division of Forestry, for the year ending December 31, 1906. Reprint from Third Report of the Board; 123 pp.; 4 maps.
Report of the Division of Forestry, for the year ending December 31, 1907. Reprint from Fourth Report of the Board; 70 pp.
Report of the Division of Forestry, for the year ending December 31, 1908. Reprint from Fifth Report of the Board; 85 pp.

** This Bulletin will be sent only to persons interested in the subject

* Out of print.

Board of Agriculture and Forestry.

PUBLICATIONS FOR DISTRIBUTION—Continued.

DIVISION OF ANIMAL INDUSTRY.

- * "Inspection of Imported Live Stock." Rule 1; 1 p.; 1905.
- * "Inspection and Testing of Imported Live Stock for Glanders and Tuberculosis." Rule 2; 1 p.; 1905.
- "Concerning Glandered Horse Stock in the Territory." Rule 3; 1 p.; 1905.
- * "To Amend Rule 1, Inspection of Imported Live Stock." Rule 4; 1 p.; 1907.
- "Rules and Regulations, Inspection and Testing of Live Stock." Rules and Laws; 11 pp.; Revised; 1910.
- "Quarantine of Horse Stock from California." Rule 8; 1 p.; 1908.
- Report of the Division of Animal Industry, for the year ending December 31, 1905.
Reprint from Second Report of the Board; 62 pp.
- Report of the Division of Animal Industry, for the year ending December 31, 1906.
Reprint from Third Report of the Board; 41 pp.; 3 plates.
- Report of the Division of Animal Industry, for the year ending December 31, 1907.
Reprint from the Fourth Report of the Board; 104 pp.; 6 plates.
- Report of the Division of Animal Industry, for the year ending December 31, 1908.
Reprint from Fifth Report of the Board; 44 pp.

DIVISION OF FORESTRY.

FOREST AND ORNAMENTAL TREE SEED AND SEEDLINGS FOR SALE AT THE GOVERNMENT NURSERY.

The Division of Forestry keeps constantly on hand at the Government Nursery, seed and seedlings of the important native and introduced trees. These are sold at prices just covering the cost of collection or growing.

The list includes both forest and ornamental trees, such as Silk Oak, Koa, various species of Eucalyptus, Golden and Pink Showers, Pride of India, Poinciana, Albizzia, etc. The price of the seed varies from 10 to 50 cents per ounce. The seedlings may be had for 2½ cents each, except a few kinds which are 5 cents. Seed of the various palms is also for sale; the price per 100 varying from \$1.00 to \$2.50. All seed is tested before being sent out, which insures its being good.

All communications in regard to seed or trees should be addressed to David Haughs, Forest Nurseryman, Box 331, Honolulu, Hawaii.

RALPH S. HOSMER,
Superintendent of Forestry.

DIVISION OF ENTOMOLOGY.

To give information about insects free of charge is one of the duties of this Division and Hawaiian readers are hereby invited to make inquiry in person and by mail. In order to be able to advise intelligently or send the right kind of useful insects for relief we like and sometimes it is indispensable for us to see the insect suspected or caught in the act, also specimens of the injury. In a tin with a hole or two, or a wooden box specimens may be mailed at 3rd class rates. When specimens are not accompanied by letter *always* write your name and address in the upper left-hand corner of the package. Address all communications **SUPERINTENDENT DIVISION OF ENTOMOLOGY, P. O. BOX 331, HONOLULU, HAWAII.**

EDW. M. EHRHORN,
Superintendent.

VOL. VIII

OCTOBER, 1910

No. 10

Price, 10c. Per Copy; Per Annum, \$1.00; Foreign, \$1.25.

THE
Hawaiian Forester
AND
Agriculturist

A MONTHLY MAGAZINE

OF

Forestry, Entomology and Agriculture

ISSUED UNDER THE DIRECTION

OF THE

BOARD OF COMMISSIONERS OF AGRICULTURE
AND FORESTRY.

PUBLISHED MONTHLY.

Entered as second-class matter at the Post office, at Honolulu, Hawafi.

ADDRESS ALL COMMUNICATIONS TO

DANIEL LOGAN,
EDITOR "THE FORESTER,"

P. O. BOX 366,
HONOLULU, H. T.

For business relating to advertising or subscriptions, address

HAWAIIAN GAZETTE CO., LTD., Publishers,
VON HOLT BLOCK, 65 S. KING ST., HONOLULU, HAWAII.

OFFICERS AND STAFF OF THE BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY.

Marston Campbell, *President and Executive Officer.*
J. M. Dowsett P. R. Isenberg
H. M. von Holt Albert Waterhouse

Ralph S. Hosmer, *Superintendent of Forestry and Chief Fire Warden.*
David Haughs, *Forest Nurseryman.*
Joseph F. Rock, *Botanical Assistant.*
David Kapihe, *Forest Ranger for Tantalus.*

Edward M. Ehrhorn, *Superintendent of Entomology and Chief Inspector.*
 Albert Koebele, *Consulting Entomologist.*
 H. O. Marsh, *Assistant Entomologist.*
 D. B. Kuhns, *Inspector.*
 Fred Muir, *Beneficial-Insect Collector.*
 Bro. M. Newell, *Fruit and Plant Inspector, Hilo, Hawaii.*
 Robert R. Elgin, } *Mahukona, Hawaii.*
 W. O. Aiken, } *Honorary Fruit Kahului, Maui.*
 W. D. McBryde, } *and Plant Inspector Koloa, Kauai.*
 Dr. W. B. Deas, } *at Hana, Maui.*
 Wm. Robb, } *Lahaina, Maui.*

Victor A. Nörsgaard, *Superintendent of Animal Industry and Territorial Veterinarian.*
L. N. Case, *Assistant Territorial Veterinarian.*
John Vanhuizen, *Live Stock Inspector.*
J. C. Fitzgerald, *Deputy Territorial Veterinarian for Maui.*
H. B. Elliot, *Deputy Territorial Veterinarian for Hawaii.*
A. R. Glaziyer, *Deputy Territorial Veterinarian for Kauai.*

Miss Ella K. Davton

THE HAWAIIAN FORESTER *and* AGRICULTURIST

VOL. VIII

OCTOBER, 1910

No. 10

FORESTRY IN MINNESOTA.

It is always interesting to know what is being done outside of your own part of the nation, or of the world, with regard to any industry or cause with which you are concerned at home. With less than ten pages of reading matter, the *Minnesota Forester* for June, edited by the Division of Forestry, University of Minnesota, contains a variety of useful information under eight heads. It is the official bulletin of the Minnesota Forestry Association, a body which has undertaken the passage of certain tax amendments, at the election in November, the purpose of which is to provide funds for State forestry work.

One of the articles discusses a law now in force which compels the lumbermen to burn all the debris left after the lumbering operations before the first of May. Some objections to the law are rebutted, while others are sustained, but the faults are held to be those which "are common to all laws attempting to make some one provision or mandate suit the varying conditions of the different parts of a whole State." Of course, the object of the law is the prevention of forest fires. To have the law work satisfactorily throughout the State, the article says, it would be necessary to divide the State into districts and place a competent man in charge of each. The present obstacles to such a plan are the lack of funds and the lack of competent men, and the article puts it "up to the lumbermen who are not satisfied with the working of the present law to see to it that the next legislature provides the means for a better one. Minnesota," the writer concludes, "is already in the lead in such matters and she should be kept ahead." The plan here suggested for Minnesota may be well to keep in mind for future consideration in Hawaii. With the many forest reserves now established in these Islands, and the rapid growth of trees here, it will not be long before a paid force of forest rangers must be employed to watch against fires as well as trespass by man or beast.

Another article in the *Minnesota Forester* arrests atten-

tion. "An Example of Sylviculture" it is headed, and its character is revealed in these introductory sentences: "We hear and see a great deal about the sylvicultural systems in use in Germany, but they seem so far removed from our conditions, so far in advance of our development, that they seem unreal to us. They are regarded more in this country as abstract theories rather than something to be put into actual practice. Once in a while, however, the proper conditions are accidentally brought about and the forester wandering through the forest comes suddenly upon a faithful example of one of the German systems. In just this way the shelterwood system of reproducing a crop has accidentally been worked out in almost all its details on a half section of Itasca Park. The result is nearly perfect reproduction over a considerable portion of the tract." It is mentioned in the article that the process was accidentally approximated in the logging of a section of the park mentioned, and the following is stated as the process when carried out on a definite plan based on principles derived from the study of forest growth:

"The shelterwood system, briefly described, is this: The stand of mature timber being too dense to allow the leaf litter to rot properly in its shade, a light thinning is made—that is, a few of the trees are taken out to let in the sunlight and allow better air circulation. These new conditions soon bring about the rapid rotting of the vegetable covering on the ground. As soon as the leaves and other litter are sufficiently rotted the mineral soil is laid bare as a seed bed for the mature seed. In such a bed the seed germinates readily and can easily force its roots into the soil, whereas the seeds falling on dead, undecayed leaves, though they may germinate well enough if the leaves be damp, exhaust all their vitality before they are able to force their roots through to the nourishing mineral soil.

"That is the first step, a thinning for the preparation of the seed bed. When the seedlings have come up, more light is needed for their growth, and another thinning must be made. It is still necessary to keep enough old trees to shade the seedlings somewhat and seed up any openings that may remain. As soon as this seeding is complete and the seedlings are old enough to stand the sunlight the remaining mature timber is cut, either all at once or in two separate cuttings. The ground is then fully stocked with young seedlings, which, with proper care, grow up to form the forest of the next generation."

"Road Building" is the title of the final article in our Minnesota contemporary. It is short, and as it gives a description of cheap road-making, such as might profitably be adopted in this Territory for new roads, whether built by the counties as parts of their highway systems or by the Terri-

tory to open up homestead tracts, it is here reproduced in full:

"A piece of work recently completed on the north fire-break brought out some rather interesting—and, to most people, quite new—data on the building of forest roads. It has long been known that the scraper form of road grader was an excellent thing to remodel an old road or keep a new one in condition, but it would not generally be considered a promising machine for making an out-and-out new road where no road was before. This, however, was done, and done very successfully.

"It is the policy of the Forestry Board to make the fire-breaks in the form of roads wherever possible that the woods may be more accessible and that the travel may keep the fire-break free from grass, weeds and brush. It has been the usual method to clear off the brush from a strip two rods wide, and then plow and drag this to the width of a rod. Where absolutely necessary some grading was done with the plow and slasher. The result was a road which could be used at a pinch, but that was all.

"In this case the heavy brush was cut away, the larger stumps and stone blown out with dynamite and the road grader put in. Two yoke of oxen and three pairs of horses took the machine easily and steadily through the worst of it. Rocks half the size of a man's body were scraped from their beds and rolled aside. The roots of the brush and the stumps of small saplings did not seem to bother at all. The result was a comparatively good road, well rounded and carefully graded. The cost was lower than that of the old method."

POINTERS FROM TENNESSEE.

The twenty-second annual report of the Agricultural Experiment Station of Tennessee for 1909 has been received. A few extracts from it are given below, which may be of benefit to local homesteaders and dairymen.

Value of Lime.

Referring to trials at various places of corn, wheat, oats, soy beans, etc., the report says:

"With the exception of work necessarily just begun at Jackson, the majority of these experiments are continuations of those commenced in 1905, 1906, and 1907, and are increasing in value with each additional year's results. Lime proves to be of fundamental importance on the majority of soils, and by its use not only increased yields of legumes are obtained, but also of corn and wheat. The general recommendation as

first made, that one ton of burnt lime or two tons of ground limestone to the acre be applied once in six or eight years, is apparently ample under average conditions. At the Jackson Station the effect of lime on soy beans and cowpeas was unusual, the crops being practically doubled. Soil and fertilizer problems continue to be of first importance, both on account of the demand of the agricultural interests of the State and the large number and wide divergence in plant food requirements of the soil types."

Dairying.

The following from the report of the dairyman should be interesting in view of the fact that a model dairy is projected by the College of Hawaii, from which as good results for the dairy industry here as those that the University of Tennessee is offering the dairymen of that State may be expected:

"Feeding experiments with the dairy herd were conducted throughout the months of January, February, and March. Home-grown feed stuffs were compared with commercial feed stuffs with reference to efficiency and economy of production; also different home-grown rations were compared one with another; while special attention was given to increased palatability of the rations during these three months of experimental feeding. The work as a whole should be repeated before the results appear in bulletin form. A few conclusions, however, stand out preëminently. They are as follows:

"1. Home-grown rations are just as efficient as commercial rations, and more economical. The secret of successful dairying in Tennessee is to reduce the cost of production by feeding these home-grown rations.

"2. Soy-bean meal is equal to cotton-seed meal for milk production and is cheaper, while the bean stover is more relished by stock than corn stover.

"3. Palatability will improve the efficiency of any roughage ration by increasing the digestibility of the components of the ration and stimulating the appetite for greater consumption. This desired feature in feeding was secured by mixing the cut stover, hay, and straw with corn and sorghum silage in alternate layers and sprinkling each layer of the dry roughage with salt and water and allowing the whole to stand twelve hours before feeding.

"The herd of 30 cows for 1909 shows considerable improvement over 1908 in milk and butter-fat production and profits. The average cost of keeping each cow was \$5.66 greater than for 1908. This was due to the fact that they were rather more liberally fed on grain, and consumed more roughage as a result of palatable rations. The average increased production for each cow over 1908 was 375.2 pounds of milk and 23.14 pounds of butter-fat, equivalent to 26.99 pounds of but-

ter. The average increased profit for milk for each cow was \$4.72 and for butter \$11.01. The greater average increase for butter is due to the fact that the milk for 1909 was slightly richer in fat than that for 1908 and the butter was valued at 30 cents per pound instead of 25 cents."

Dry Farming.

Claiming that, "While Tennessee is often looked upon as outside of the corn belt, and the average yield is very low, the climatic conditions are most favorable for corn production," the report tells how to overcome the obstacle of "a dry July," which sometimes cuts down the corn crop. Its advice on this matter is a lesson in dry farming, which ought to be useful to small farmers in some parts of this Territory:

"We can not control the rainfall, and in Tennessee very few of us can irrigate, but we can conserve the moisture of the earlier months. If, by filling our soils with vegetable matter (green manure crops or stable manure), by preparing a deep seed-bed, and by thorough cultivation, we can hold the moisture of the preceding months in the soil until it is needed in July, we can tide over these droughts at tasselling time and produce a good crop in spite of them. This is no idle fancy of a book farmer, but a practical thing that is being done every year by our most practical and most successful farmers. If a few can do this, all can do it, and by so doing we will not only increase our corn crop in bad years but will increase it in good years also. Not only will we carry our State from near the bottom to near the top of the list of corn-growing States, where Nature intended she should be, but we will increase the yield of all our crops and will double and treble the value of our farms."

NATIONAL FORESTS AS NATIONAL PLAYGROUNDS.

Washington, D. C., August 27.—Before the year's outing season is over nearly half a million persons will have sought recreation and health in the national forests of the United States. According to the record of the U. S. Department of Agriculture, the total last year was, in close figures, 406,775. With the finest mountain scenery and much of the best fishing and big-game hunting in the United States, the national forests, made more and more accessible each year through protection and development by the government, are fast becoming great national playgrounds for the people.

The use of the forests for recreation is as yet in its beginning, but is growing steadily and rapidly—in some of the

forests at the rate of 100 per cent. per annum. The days seem not far distant when a million persons will annually visit them.

The records show that the seasonal use of the forests runs from two months in a Colorado forest, such as the Routt, to twelve months in an Alaskan, such as the Tongass. But the uses differ. In Colorado the 2,000 visitors entered the forest to fish, to camp, to climb, and to drink the medicinal waters; in Alaska the 1,000 almost solely to hunt and fish. The 21,000 persons who went into the Coconino forest, Arizona, during nine months, went to camp or to enjoy the scenery. During four months 50,000 persons visited the Angeles, California. The most popular of the forests is the Pike, containing the famous peak of that name. The various attractions within its limits, including the scenic railway, drew 100,000 tourists and others. By principal States the national forest visitors numbered 23,000 in Arizona, 103,000 in California, 140,000 in Colorado, 19,000 in Montana, 10,000 in New Mexico, 33,000 in Oregon, 22,000 in Idaho, 16,000 in Utah, and 12,000 in Washington.

Of the natural wonders and landmarks of interest in the national forests several have been set apart as national monuments, among them Cinder Cone, a great lava basin in California; the Gila Cliff Dwellings, extensive remains of a prehistoric race in New Mexico; the unsurpassed Grand Canyon of the Colorado, in Arizona; Jewel Cave, South Dakota; Lassen Peak, the terminus of a long line of extinct volcanoes in the Cascades; the Pinnacles, a collection of remarkable jagged peaks in California; and the Tonto, a group of prehistoric ruins in the Tonto forest in Arizona. The Big Trees, Glacier Park, the Petrified Forest, the Oregon Caves, and numerous other phenomena serve to attract other hosts of visitors.

The sportsman finds his paradise in the national forests. In many of them big game abound. The rangers and the guards, besides the service they perform against the spread of fire, often point out the best site for the camper and the easiest route. A record of 9,218 miles of trail cut, 1,236 miles of road laid out, and 4,851 miles of telephone line strung tells what the government has done in the way of pushing the conveniences of civilization into the primeval forest. The day of the wilderness of the savage and the pioneer is swiftly passing; the day of the national forests as productive resources and as national parks approaches. The report of last year's administration by the U. S. Department of Agriculture evidences the rapidity of the transformation.

SCHOOL GARDENS OF THE HAWAIIAN ISLANDS.

Vaughan MacCaughey, College of Hawaii, in the Southern Workman.

School gardens are preëminently local products. They reflect their environment as truly as does a placid, green-girt lake. They are affected largely by immediately impinging conditions. General statements may be made concerning the educational principles involved, but the practical development and success of any school garden must ultimately find its basis on keen sight into, and compliance with, environmental influences.

The evolution of the school gardens as a part of the educational system of the Territory of Hawaii, is a fitting illustration of the above remarks. The Hawaiians (or Sandwich Islanders, as they were called in the early days) were naturally an agricultural people. Their food supply came chiefly from the fertile lowlands that engirdle the Islands, and from the nearby ocean. Taro, coconuts, breadfruit, bananas, yams, sweet potatoes, and a few wild fruits of minor importance constituted their vegetable food. Fish, fowl, hog, and dog supplied the remainder of their diet. The pounded and fermented root of the taro, forming a starchy paste called poi, was their chief dish. "Poi and fish" is a by-word here for a meal. The limited area of the Islands restricted nomadism; the entire lack of large game cut off hunting; and the absence of grazing domestic animals prevented pastoral life. Thus this brown-skin people was compelled, perforce, to accept a stable, agricultural existence.

They were peaceable farmers and fishermen, not savage cannibals, as were their kin of the South Seas. Periodically, at various favorite places, great markets and fairs were held. Here the best handiwork and finest crops and livestock were exhibited and sold. These great fairs were surprisingly like the modern county fair of the Middle States, and were decidedly agricultural.

DEVELOPMENT.

When Captain Cook discovered the Islands in 1778, he remarked the extensiveness of the cultivated lands along the seashore; and it was appropriate that in the first band of missionaries sent hither, there should be a skilled farmer and mechanic, Mr. Daniel Chamberlain. In several years he and his family instructed the natives in agriculture and the rudiments of mechanic arts.

The first school garden was undoubtedly established by the

early missionaries on the Island of Hawaii. They spent much of their time in teaching the natives methods of producing garden vegetables and field crops. The natives rapidly absorbed the new ideas, and the demand for instruction became so great, that in 1830 an urgent petition was sent to the American Board of Missions, asking for a number of instructors to train the Hawaiian people in agricultural pursuits. The petition received the hearty support of the native population, and was signed by fifteen of the high chiefs. In response instructors were sent, and very soon there were many prosperous fields of wheat, sugar cane, vegetables, etc.

As schools gradually developed, it was natural that the agricultural phase of education should continue in importance. Those in charge of the school affairs of the Islands saw that these people needed training through concrete things, object-lesson teaching, industrial and economic. Thus, in the past ten years, nearly every school in the Territory, either public or private, has given some attention to mechanical and agricultural work, largely in the form of school gardens. Excellent gardens have been established at the Lahainaluna Industrial School, the Hilo Boarding School for Boys, the Kamehameha Schools, the Waialeale Industrial School, and the Normal and Training School.

CHARACTERISTICS.

There are a number of local factors that make the school gardens of Hawaii decidedly different from those of the mainland. In the first place, the garden year corresponds closely with the school year. There are two main seasons: the wet season and the dry season. The wet season, corresponding roughly to the mainland winter, is the growing season; the summer is the dry season, during which gardening slackens. The school year—September to June—thus fortunately keeps pace with the development of the garden. The children can plant their seeds during the first weeks of school, and be confident of shortly reaping the results of their labors. This is in striking contrast with the gardens of the East, where extensive planting cannot well begin until late springtime, and only rapidly maturing crops can be raised before the close of school.

Secondly, the school gardeners here are not only fortunate in the coincidence of the school year and the growing season, but the climate as a whole is ideal for garden work. Uniformity is the keynote of this sub-tropical climate. There are no frosts, no violent thunder storms, no hurricanes nor cyclones. Frequent light local showers are characteristic. At Honolulu the average annual temperature is seventy-four degrees, which varies only a few degrees from day to day.

The nights are invariably cool. The thousands of miles of temperate sea on every side make fluctuations in the weather rare. The climate can be "depended upon" to an extent unknown to the weather-suspicious Easterner, and gardening can be conducted with exceptional assurance of results.

Gardening here is materially assisted by the remarkable ease and rapidity with which crops mature. In a well-ordered school garden, after the first few weeks, planting and harvesting go on continuously, hand-in-hand. A few examples, culled from the excellent report of Mr. Buchholtz, a gardener on Hawaii, will suffice to elucidate this important factor. Mr. Buchholtz's garden is at an elevation of 1,650 feet above sea level (differences in altitude are, of course, correlated with differences in the maturing period of plants). On his farm he secures four crops of potatoes in succession in the same piece of land in twelve months; radishes become eatable ten days after sowing; cucumbers, tomatoes, lima beans, grow and bear all the year round; onions grow very large, and mature in six months; pumpkins and squashes bear abundantly for several years; etc., etc. It is evident that this is a land where plants grow easily, a contrast with the careful nursing and frequent disappointments too common in the East.

This region is unusual in the very great number of exotic plants that have been introduced, and that can be grown and studied in a school garden. In a well-organized garden the children are able to become familiar with a range of plant life quite beyond the scope of our Eastern gardens. All of the plants of world-wide economic importance can be raised here, and thus the garden work assumes a fruitful geographic and sociological aspect. The child who has cared for a little patch of rice will understand the Oriental far better than one who has not; and tales of the rice fields of India, and Japan, and Louisiana will have a new meaning for him. Pineapples, bananas, vanilla, mangoes, citrons, limes, coconuts, sugar-cane, coffee, sisal, rubber—plants of which the Eastern child has but a vague conception (being familiar with the commercial portion only) are common here, while the great quantities of fruit shipped in from California and the Northwest familiarize the children with mainland products.

THE RACE FACTOR.

A matter of great importance is the diverse nationalities represented in the public schools. These islands, inhabited at first only by a native population, are now occupied by many peoples—Hawaiian, Japanese, Chinese, Portuguese, American, British, Scandinavian, German, Porto Rican, Korean, and every possible intermingling of these. The race

elements represented most largely in the schools are Oriental, Hawaiian, and Portuguese. These children come from widely dissimilar homes. Their languages, their traditions, their beliefs, their whole mental attitudes vary as widely as do their physical characteristics. The educator has problems entirely different from those his Eastern brother works. He must develop each one of these boys and girls along lines which are not evidently antagonistic to their race instincts. A classroom full of children here is entirely too heterogeneous to be dealt with in toto; each unit is radically and racially different from every other unit and individual training is a paramount necessity. This development of the individual, and its enforced emphasis along industrial lines (for the great mass of the people are poor), finds fitting expression in the school garden. The work is with real things, which these polyglot children understand far more easily than the printed book. It is through the school garden that these children of many peoples can be most easily transformed into efficient laborers, working harmoniously together for the common welfare. It is through the school garden (one of the lost tools that the new education has grasped) that the new generation will assimilate this new civilization, and carry it forward.

POINT OF VIEW.

A school garden may be conducted with one or more of several different purposes in view: (a) To teach the child elementary principles of plant life—elementary botany or nature study. This garden is really a nature study laboratory, and the interest centers, not so much in the kinds or amounts of crops raised, as in how they grow, how they secure light, food, water; their various enemies; and kindred topics. From this standpoint the garden may be made a very valuable adjunct to the nature study work of the school, furnishing a wealth of concrete illustrative material, and suggesting many fascinating experiments and discoveries. (b) To teach the child how to raise successfully certain kinds of plants adapted to the region. Here the basis is agricultural and economic, instead of scientific and experimental. Its value lies chiefly in its practical results, and the size of the crop becomes an item of importance. There are three possible markets for crops raised in this garden:

- 1 *School*—The crops may be used in the cooking department, both for demonstration and as a part of lunches served to the pupils. This is an excellent arrangement, because it logically and closely correlates the garden and the kitchen, and approximates the conditions of real life. The relation between raising a crop and eating it is simple and direct, appealing to the child and stimulating interest. This method has been

used with considerable success at the Territorial Normal School, the garden products being used by the domestic science department.

2 *Home*—Here the child either sells the results of his garden labor to his family or contributes them gratis. In either case the results are good, furnishing a definite link between the school and the home. It develops in the child the desirable ideas of responsibility and pride in one's work that are always concomitant with independent production. The lessons of diligence, carefulness, and regularity are taught without words. The boy who allows his plat to run to weeds has nothing to expect in the way of profitable returns. Nowhere is taught the lesson of negligence and procrastination so vividly as in a garden. A withered plant dead because the boy forgot to water it, speaks to him more eloquently than any teacher. He learns that real law has no circumlocution.

3 *Public Market*—Here the financial interest is preëminent. The actual returns are reduced to cash. This may sometimes be desirable with gardens operated by the grammar grades; but as a general rule the relation between the child and the plant should be more personal than the dollar relation. Financial stimulus may be excellent in business, but should not be over-exercised in education.

MANAGEMENT OF SCHOOL GARDENS.

The ideally managed garden is one in which each child labors, both for himself, individually, and for the common good; his labors being carefully supervised and used educationally. A typical report, from the Waianae school, illustrates this combination of individual and communal labor:

"Twenty-four of the larger boys have been divided into two classes, with an overseer to each. One class works from eight-thirty to nine o'clock in the morning, while the other works from two to two-thirty in the afternoon. Each boy owns two plots five by sixteen feet, on which vegetables—radishes, beets, carrots, turnips, lettuce, etc. — are being planted. Besides, as general property, the boys have sixty banana plants, which are watered every other day."

The plants suitable for school gardens in Hawaii include the following: taro, rubber, sisal, banana, pineapple, coffee, forage grasses, vanilla, tobacco, corn, sweet potatoes, string beans, onions, tomatoes, sugar cane, Chinese cabbage, and yam.

The reports received concerning tree planting are very encouraging. This extensive advance has been made possible largely through the interest and aid of the Territorial Bureau

of Forestry, which has sent much valuable information to teachers from its offices, and thousands of young trees from its nurseries.

A LIST OF VEGETABLES SUITABLE FOR SCHOOL GARDENS IN HAWAII.

Class One.—Crops Grown For Subterranean Parts.

Group I. Root Crops.

1. Beet, Early Eclipse.
2. Carrot, Danver's Half-Long Orange.
3. Radish, French Breakfast.

Group II. Tuber Crops.

4. Potato, Burbank's Seedling.
5. Sweet Potato, Hawaiian.

Group III. Bulb Crops.

6. Onion, Madeira or California.

Class Two.—Crops Grown For Foliage Parts.

Group IV. Kale Crops.

7. Cabbage, Flat Dutch.
8. Kale, Dwarf Curled.

Group V. Pot-herb Crops (usel for "greens").

9. Spinach, Victoria.
10. Taro.

Group VI. Salad Crops.

11. Lettuce, Head.
12. Parsley, Champion Moss Curled.

Class Three.—Crops Grown For Fruit or Seed Parts.

Group VII. Pulse Crops.

13. Bean, Stringless, Blackwax, Bush Lima.
14. Pea, Giant Sugar.

Group VIII. Solanaceous Crops.

15. Tomato, Improved Stone.
16. Egg Plant, Black Beauty.
17. Pepper, Large Bell, Red Cayenne, Tabasco.

Group IX. Cucurbitous Crops.

18. Cucumber, Everbearing.
19. Muskmelon, Improved Rocky Ford.
20. Watermelon, Alabama Sweet.
21. Pumpkin, Sugar.
22. Squash, Crookneck.

Group X. Miscellaneous.

23. Sweet Corn, Country Gentleman.

24. Okra, White Velvet.

A LIST OF BOOKS RELATING TO SCHOOL GARDENS.

1. The Nature-Study Idea. L. H. Bailey. Doubleday, Page and Company, New York. 1905.

2. Nature-Study and Life. Clifton H. Hodge. Ginn & Company, Boston. 1903.

3. Agricultural Education, including Nature Study and School Gardens. James Ralph Jewell. 2nd edition, revised. Govt. Printing Office, Washington. 1908.

4. School Gardens. B. T. Galloway. Govt. Printing Office, Washington. 1905.

5. School Gardening and Nature Study in English Rural Schools and in London. Miss Susan B. Sipe. Govt. Printing Office, Washington. 1909.

6. Children's Gardens. Henry Saxton Adams. Trans. Mass. Hort. Soc., 1907. Part II, Boston, 1908.

7. How to Make a School Garden. Hemenway. Doubleday, Page and Company, New York.

OUTLOOK FOR SCHOOL-GARDEN WORK.

The outlook for school-garden work in the Territory of Hawaii is indeed bright. The movement, already well established, and recognized as an essential factor in the education of these peoples, will continue to develop healthily, as the whole school system normally develops. The work here is by no means perfect. There are many gaps to be filled, many problems unsolved, especially with regard to the actual teaching. One must constantly bear in mind that he is not raising plants, but children; and that his success is to be measured, not by bushels of beans, but by human lives. The center of the garden is the soul of the child. It should be, in verity and truth a kindergarten, a child-garden. This is no easy task. Bringing a rare fruit to maturity is mere toying compared to the mighty task of perfecting and enriching a child's soul—rarest, most fragile, blossom of all. The difficulty is many times multiplied, if the child belongs to another race. But the gardening instinct is strong in all children. Perhaps it is remnant of the garden paradise from which the souls of children come. This island-world is a land run riotous with green,—heaven-climbing valleys livid with green tropical tangles,—white glistening coral sands fringed with waving cocopalms; wide plains of undulating feathery foliage—love of these is the child's right. We are told that paradise was a garden; perhaps our children shall come through green gardens, back to Paradise again.

BOARD OF AGRICULTURE AND FORESTRY.

Minutes of the meeting of the Board of Commissioners of Agriculture and Forestry, held in the Board room, at the Capitol, on Wednesday, August 3, 1910, at 2 o'clock p. m.

Present: Marston Campbell, President and Executive Officer; Messrs. J. M. Dowsett, H. M. von Holt, and Albert Waterhouse, members; Dr. V. A. Norgaard, Territorial Veterinarian.

FORESTRY.

At the last meeting of the Board it was voted that the Superintendent of Public Works be requested to institute condemnation proceedings for the land of Kehenna II, for forest reserve purposes, the heirs of the Woods Estate having refused the offer made them of \$7.50 per acre; in regard to this the President reported that the Survey Office is preparing all of the necessary documents in accordance with the desires of the Attorney General to go ahead with the condemnation proceedings.

FINANCES.

The President read the regular monthly statement of the finances of the Board of Agriculture and Forestry, prepared by the Secretary, which was accepted and ordered placed on file.

DAIRY CATTLE INSPECTION.

In regard to the extensive work now being carried on, in the matter of tuberculin testing of cows, by the Territorial Veterinarian, the President reported that the Board of Supervisors had allowed the Board an allotment of \$250 per month, for three months, to help defray the expenses. The Board of Agriculture expressed a desire to continue to assist the Board of Supervisors in this work in any way possible, so long as the appropriation continued. The Secretary was instructed to request Dr. Norgaard to frame a letter to that effect and to submit it to the Board for its approval at the next meeting. Carried.

ANIMAL INDUSTRY.

Dr. Norgaard submitted his report, dated August 2, in regard to the prevalence of tuberculosis among the dairy cattle in the City and County of Honolulu, stating facts and making a number of recommendations.

It was voted that a copy of this report be placed on file, that the County Board of Supervisors be supplied with one copy, and that the press be given one copy, with the understanding that it be published in full.

Mr. Campbell said that Dr. Norgaard had been very particular in regard to the reacting animals.

In explanation of his statement that the Isenberg dairy was partly clean, Dr. Norgaard said that the reacting animals have been segregated, that the stalls of the infected cows have been thoroughly cleaned and disinfected, separate pastures and watering troughs have been provided for the healthy animals, and no contact between the affected and the well ones is allowed; separate milking utensils have also been provided, and it is the owner's wish that no reacting animals be placed on the market. The disposal of the cattle on the part of the owner, Dr. Norgaard said, had, in nearly all cases, been voluntary, as they naturally desire to have clean dairies. These methods of segregation have improved conditions marvelously, and, from an educational standpoint, the owners are learning something about tuberculosis; they have had the indications pointed out to them and have also been talked with about the transmission of diseases and the dangers resulting from a dairy that is not cleaned out regularly.

Mr. Campbell said that the test commenced May 16, two months ago, and the condition existing today is a great improvement over the one previous to the beginning of the present investigation.

It was voted that Dr. Norgaard frame a letter for the approval of the members of the Board of Agriculture and Forestry, to be written to those owners who have requested a certificate as to the sanitary condition of their cows and dairies, and to whom Dr. Norgaard finds he can issue such a certificate.

SALE OF MEAT.

Mr. Campbell read a letter of July 29, from The Hawaii Meat Company, Ltd., in which that company calls attention to an article headed "Meat Famine Facing City," which appeared in the Honolulu Pacific Commercial Advertiser of July 26. The company referred to the refusal of the slaughterhouse to accept more than six affected cows a week, and stated that this will prevent the population from absorbing tuberculosis all in a lump, and giving out the assurance that the carcasses of the infected cattle are not sold to the trade, but boiled for the purpose only of extracting the tallow.

Mr. Campbell said he thought it but just and right to the public at large that a definite statement be given out over Dr. Norgaard's signature to the effect that no tuberculosis meat sent to the slaughterhouse had been sold for human consumption.

It was voted that Dr. Norgaard frame such a letter and cause it to appear over his signature in the press, setting forth that all animals sent by the Board to the slaughterhouse have

been killed under the supervision of the Board and according to the Federal regulations; that no diseased carcasses have been sold and that all reacting cattle that have gone to the slaughterhouse in Honolulu have first passed post mortem examination.

In regard to the local meat inspection, Mr. Campbell inquired under what conditions the Federal Bureau of Animal Industry establishes meat inspection; in reply to which Dr. Norgaard said that Federal meat inspection was never established anywhere except where animals were slaughtered for interstate or foreign trade.

Dr. Norgaard expressed appreciation of Mr. John Vanhuizen's good work, and stated that without his unfailing energy and willingness to work at all times, night and day, it would have been impossible to test the number of animals which have been attended during the past two months.

At the suggestion of Dr. Norgaard, the appointment was authorized of Dr. E. L. Glazier, Deputy Territorial Veterinarian and Livestock Inspector for the Districts of Hamakua and Kohala on the Island of Hawaii:

STATEMENT OF FINANCES OF THE BOARD OF AGRICULTURE
AND FORESTRY FROM JULY 1, 1909, TO JUNE 30, 1910, BY
ELSIE KUHN BROWN, SECRETARY TO THE BOARD OF COM-
MISSIONERS.

SALARIES.

Board—

Secretary and Stenographer (each \$100 per month).	\$2,275.00	
Botanical Assistant, Librarian and Editor of "Hawaiian Forester and Agriculturist".....	1,878.30	
Labor—Stable and Yardmen and Janitor.....	1,144.50	\$ 5,297.80

Entomology—

Superintendent	\$3,000.00	
Assistants—Consulting Entomologist, Assistant Entomologist, Inspector, Assistant Inspector, Hilo Plant and Fruit Inspector.....	5,291.00	8,291.00

Forestry—

Superintendent	\$3,000.00	
Assistants—Forest Nurseryman, Forest Ranger, Laborers and Seed Collectors, Laborers at Hilo Nursery, Laborers at Papapaholahola Spring Reserve, Kauai	5,268.95	8,268.95

Animal Industry—

Superintendent	\$3,000.00	
Assistants—Asst. Territorial Veterinarian, Livestock Inspector, Quarantine Station Caretaker, Deputy Ter. Vet. for the District of Maui.....	3,369.64	6,369.64

Total		\$28,227.39
-----------------	--	-------------

GENERAL EXPENSES.

Administration—

Routine—Repairs to Office Buildings, maintenance of grounds, gas, ice, electric light, laundry, telephones, etc.....	\$ 1,654.33
Stable—Horse feed and repairs to wagons, harness, shoeing, pasture, etc.	1,695.98
Printing and Publications—Including regular charges for "The Hawaiian Forester and Agriculturist".....	1,053.18
Stationery and Postage.....	191.10
Library—Purchase of books and periodicals.....	827.79
Traveling Expense of Commissioners.....	42.80
Office Incidentals—Office supplies, (typewriters, carbon paper, pencils, note books, etc.), cablegrams, minor expenses.....	188.45
Total	\$ 5,653.63

Entomology—

Inspection—Furniture for inspection room at wharf, cartage of condemned fruit, etc., to be destroyed.....	\$ 46.65
Travel	114.50
Laboratory Supplies—Chemicals and apparatus.....	208.54
Total	\$ 369.69

Forestry—

Forest Reserves—Expenses in connection with marking boundaries, suppression of forest fires and administration of forest reserves	\$ 35.00
Extension—Collection and importation of seeds and plants, distribution of seedlings, including packing and freights..	1,661.80
Herbarium—Field expenses of Botanist, Herbarium supplies, hire of laborers for temporary periods.....	1,723.54
Travel	601.57
Arbor Day—Free distribution of trees and shrubs.....	876.92
Eucalyptus Study—Special investigation of planted groves....	677.84
Total	\$ 5,576.67

Animal Industry—

Travel	\$ 107.00
Laboratory Supplies—Chemicals and apparatus.....	295.60
Quarantine Station	2,607.33
Incidentals—Cremating dead horses, etc.....	15.00
Total	\$ 3,024.93

SUMMARY.

Salaries	\$28,227.39
Administration	5,653.63
Entomology	369.69
Forestry	5,576.67
Animal Industry	3,024.93

Total expenditures for the year, from July 1,
1909, to June 30, 1910.....\$42,852.31

Allotment from July 1 to December 31, 1909, for six
months, per month \$3,425.00.....\$20,550.00
By special allotment, December 27, 1909..... 1,500.00

Total \$22,050.00

From July 1 to December 31, 1909, total expenditures, all divisions.....	21,859.52	
December 31, 1909, balance to credit of Board.....		\$ 190.48
Allotment from January 1 to June 30, for six months, per month \$3500.00.....	\$21,000.00	
From January 1 to June 30, 1910, total expenditures all divisions	20,992.79	
June 30, 1910, balance to credit of Board.....		7.21
Total to credit of Board, from July 1, 1909, to June 30, 1910.....		\$ 197.69

KOHALA FOREST RESERVE.

Special allotment for planting and fencing, to be available December 1, 1910, (\$5,000.00 of this sum to be used in forest planting of Government Lands above Waimea Village)....\$20,000.00

PUPUKEA FOREST RESERVE.

For planting and fencing Pupukea-Paumalu Forest Reserve and Water Reserves A, B and C.....	\$ 3,500.00	
May 31, 1910, to C. G. Owen for planting trees in Water Reserve C, contract dated February 20, 1910, part payment.....	\$ 469.44	
June 25, 1910, to Otto Oss for constructing forest fence, contract dated May 20, 1910, part payment	467.50	936.94
Balance on hand.....		\$ 2,563.03

Minutes of the meeting of the Board of Commissioners of Agriculture and Forestry, held in the Board Room, at the Capitol, on Wednesday, August 24, 1910, at 2 o'clock p. m.

Present: Marston Campbell, President and Executive Officer; Messrs. Harry von Holt and Albert Waterhouse, members.

The minutes of the meeting of August 3 were read, ordered approved and placed on file.

FORESTRY.

In accordance with a motion carried at the previous meeting—that the Superintendent of Public Works be requested to institute condemnation proceedings for the lands of Kehena II for forest reserve purposes, the heirs of the Woods Estate having refused the offer made them of \$7.50 per acre—President Campbell reported that all the surveys, descriptions and blueprints have been completed and are now in the hands of the Attorney General for entering condemnation proceedings.

PLANTING PLAN, KOHALA MOUNTAIN.

The Superintendent of Forestry submitted for the Board's attention an outline for forest planting, suggesting that it be used as a guide in the carrying out of the planting project proposed for the southern slope of the Kohala mountain above Waimea village, South Kohala, Hawaii, this project to be carried on jointly by the Territorial Government and the Parker Ranch. A copy of this report had been furnished the members previous to the meeting and they having made themselves familiar with the contents thereof, voted that the same be placed on file for the present, awaiting further action.

The regular monthly report of the Superintendent of Forestry and that of his Assistant, the Forest Nurseryman, were ordered accepted and placed on file and copy of each given to press for public notice.

THIMBLE BERRY.

The President read communication of August 5, from Alfred Carter, in regard to the Hitchcock or Thimble Berry, which is a natural cross between the *Rubus jamaicensis* and *Rubus rosae-folius*, a plant considered a great pest—a most dangerous one—as it chokes up the land and every particle of the root must be grubbed out or it will start fresh. Mr. Carter states that this plant seeds quickly and prolifically, that the birds carry the seed to all quarters of the Territory, and land once covered with this pest is unavailable for most agricultural crops and the expense of getting it out would be prohibitory. He urges that the Board take some action to secure a natural enemy of that plant.

In the February, 1910, "Forester and Agriculturist" is printed the result of the Botanical Assistant, Joseph F. Rock's, investigation of last August of the Thimble Berry. This article contains some valuable information in the way of description and identification of this plant.

The Board recognizes the fact that something should be done, and Mr. Waterhouse moved that Mr. Carter's letter be referred to the Entomologist with instructions to give this matter his immediate attention, he to confer with Alfred Carter and work out some scheme whereby the eradication of this destructive plant may be brought about. The motion was seconded and carried.

The President brought to the attention of the Board the fact that the Hamakua Mill Company had accepted a license (letter to Hamakua Mill Company dated July 29, 1910) whereby in return for forest planting in a recently established Hauola Forest Reserve in Hamakua, Hawaii, the company is to be allowed to cut firewood under the direction of the Board. The members of the Board expressed their approval of the President's action in this matter.

ENTOMOLOGY.

The regular monthly report of the Superintendent of Entomo-

logy was approved and copy of same sent to the press with request that it be published in full.

ANIMAL INDUSTRY.

In regard to a letter, bearing the signature of Territorial Veterinarian Nörgaard and that of County Meat Inspector Monsarrat, in regard to the slaughter of tuberculous cattle, which it was voted at the last meeting be caused to appear in the press over their signatures, setting forth that all animals sent by the Board to the slaughterhouse have been killed under their supervision, that these animals have been submitted to the most careful post-mortem examination, under the rules and regulations of the Federal Bureau of Animal Industry, etc., the President reported that the Meat Company regarded the publication of such a statement unnecessary. The Board therefore voted that this notice signed by Doctors Nörgaard and Monsarrat be placed on file for the present.

THE POND DAIRY.

The President read letter of August 4, from P. M. Pond, proprietor of the Pond Dairy, in regard to the milk question, requesting an official statement certifying to the fact that the milk they peddle is wholesome. At a previous meeting Doctor Nörgaard had stated that this is the only dairy which has in the past strictly consulted and advised with our department on all matters; that they endeavored to maintain a clean and up-to-date establishment and he considered the Pond Dairy justly entitled to such a letter. The Territorial Veterinarian was instructed to prepare such a letter over his own signature, with the privilege of publication in the press, and to submit it to the Board of Agriculture and Forestry for approval. Doctor Nörgaard's letter to Percy Pond bears the date of August 8, 1910. It was approved by each member individually.

THE TUBERCULIN TEST.

President Campbell read letter of August 6, 1910, to the Board of Supervisors, transmitting report of the Territorial Veterinarian covering the tuberculin test of the dairy herds in this city, also a carefully prepared tabulation showing the number of animals tested, suspicious, re-acted, branded, ear-marked, killed and upon which post-mortems were held.

Under date of August 11, 1910, the Territorial Veterinarian wrote a letter to the Board of Supervisors, approved by the members and President Campbell, in accordance with motion carried at the meeting of August 3, 1910, that he be instructed to frame a letter over his own signature, expressing the desire of the Board of Agriculture and Forestry to continue to assist the Board of

Supervisors in the matter of tuberculin testing of cows in any way possible so long as the appropriation continued. This letter also contains information in regard to the progress of the testing of all dairy cattle in the city to date.

DIVISION OF FORESTRY.

Honolulu, Hawaii, August 23, 1910.

Board of Agriculture and Forestry, Honolulu, Hawaii.

Gentlemen:—I have the honor to submit as follows the report of the work of the Division of Forestry during the months of July and August, 1910:

FOREST PLANTING PLANS.

The work of the most far-reaching interest during this period is perhaps the preparation of planting plans for several large tracts of land on Hawaii and Lanai. From July 12 to July 23 the Superintendent of Forestry was at Waimea, South Kohala, Hawaii, working out on the ground in consultation with Mr. A. W. Carter, manager of the Parker Ranch, a comprehensive scheme for forest planting on the hills above Waimea village, on the south slope of the Kohala mountain. For this work the Government has set apart the sum of \$5,000, which has been met by an equal sum by the Ranch. Trees have already been started in the nursery at Waimea; the planting out on the mountain will begin during the coming winter.

On his return to Honolulu the Superintendent of Forestry drew up a detailed report of directions for planting, under which the work in the field will be carried out.

In answer to an application of the Lanai Company for "a scheme of reforestation" for that island, the Superintendent of Forestry is leaving today for Lanai, where he will remain until about the end of this month, gathering data for the preparation of a report with definite recommendations covering the extension of the native forest on the higher parts of that island and the planting of forest in other sections which it is the desire of the company to devote to wood production or which are in need of forest cover. The fact that companies of the standing of the Parker Ranch, the Lanai Company and the Molokai Ranch—for whom it will be remembered a planting plan was drawn up in June—are going into forest planting on an elaborate scale, is one of the most encouraging signs of the substantial progress that forestry is making in Hawaii.

FOREST EXTENSION.

The work of growing and distributing trees from the Government Nursery at Honolulu and from the substations at Hilo, Hawaii, and at Homestead, Kauai, continues to increase. Mr. Haughs' reports for July and August, which are submitted herewith, give further details of this branch of the Division of Forestry. It may be noted here that persons in the Hilo and Puna Districts on Hawaii should apply for trees directly to Brother Matthias Newell at Hilo, and those on the west side of Kauai to Mr. Walter D. McBryde at Homestead.

Preparations for the special free distribution of trees on Arbor Day—the second Friday in November—are well in hand. Arrangements have been made for several temporary substations from which trees will be given out. This will facilitate the distribution and should help much toward making sure that each applicant gets his twenty-four trees promptly.

ADVICE AND SUGGESTIONS.

Many persons continue to visit the Government Nursery for advice as to the care of their trees and plants. In most cases members of the staff are able to give suggestions that cover the needs of situation, or to refer the applicant to those who can assist him.

Visits to private grounds are often made in answer to such inquiries, when advice can be given on the spot. In this way, too, the suggestions given reach a larger number of persons, for grounds properly cared for are an example for others to follow. A case in point are the new grounds of the University Club. Under the personal direction of Mr. Haughs considerable tree pruning has recently been done there, which could be studied to advantage by many tree owners throughout the city.

FOREST WORK AT PUPUKEA, OAHU.

The forest fences on the outer boundary lines of the Pupukea Forest Reserve on Oahu, constructed jointly by the Territorial Government and the Oahu Railway and Land Company, have now both been completed according to contract, and the cattle on the reserve have been removed by the ranch department of the railway.

The tree-planting on Water Reserve C, a part of the Pupukea Forest Reserve for which a contract was let some months ago, has also been completed, all the trees called for in the contract having now been planted. The contract is, however, not complete until the trees reach a height of three feet.

FOREST PLANTING BY PLANTATION COMPANIES ON OAHU.

It is a pleasure to record here the valuable work that is being done by the Waialua and the Kahuku Plantations in the planting of ironwood trees on their properties. Waialua has planted both windbreaks around its cane fields and solid blocks of forest on some of its mauka lands, work by the way which has now become a regular part of that plantation's program. The planting at Kahuku is almost entirely as windbreaks along the edge of the fields, in many cases the rows of trees serving both that purpose and also as shade trees along the roads. This tree planting can but be of benefit to both these plantations.

Mention should also be made here of extensive lines of trees along the main road around the island that have been put in by the County, under the direction of the Road Engineer. In some places the little trees have been injured by estrays, which would seem to indicate the desirability of a more frequent use of the local pounds. The citizens along the road should coöperate with the County officials in this matter.

FOREST RESERVES.

On August 20 a public hearing was held to consider the setting apart of the Island of Kahoolawe as a forest reserve, and also the technical reservation of certain government lands in the already established Hilo, Kau, and Hamakua-Pali Forest Reserves on Hawaii and in the Ewa Forest Reserve on Oahu. Following the hearing, proclamations were signed by Governor Frear on August 24, setting apart these lands and creating Kahoolawe a forest reserve. Full reports having been submitted to the Board in regard to these matters, it is not necessary to go into detail here. The Kahoolawe Forest Reserve has an area of 28,260 acres, and is the twenty-third forest reserve to be set apart in Hawaii. The total area of the forest reserves is now 574,896 acres, of which 386,312 acres is forest land.

BOTANICAL EXPLORATIONS.

After a successful trip to the Kohala District on Hawaii in May and June, Mr. J. F. Rock, the Botanical Assistant, returned to Honolulu for a short time early in July, prior to going to Lanai and West Maui, where he is at present. In these trips Mr. Rock has collected much herbarium material of the greatest scientific value. A later report will give the results of his work in detail.

The herbarium is also being added to by specimens received in exchange from botanic gardens and other institu-

tions in various other subtropical countries. When arranged and properly classified, this collection will be of no small value for reference and study.

HAWAIIAN FORESTER AND AGRICULTURIST.

The May number of the official journal of the Board, the Hawaiian Forester and Agriculturist, contained an address by the Superintendent of Forestry on "The Meaning of Conservation," delivered before the Social Science Association during the spring. The object of this paper was to throw light on a somewhat complex subject that is of general interest.

In this connection, while not strictly pertinent to Forestry, attention may be called to a very valuable series of articles now running in the Forester, by Mr. F. G. Krauss, Agronomist of the Hawaii Agricultural Experiment Station, entitled "Report on Rice and Cotton Investigations in China and Japan." These articles began in the May issue.

AGRICULTURAL YEAR-BOOKS.

Following his usual custom, the Hon. J. K. Kalanianaʻole, Delegate to Congress, has deposited with this Department his quota of the 1909 Yearbook of the U. S. Department of Agriculture for distribution. Over 700 copies have been sent out to selected names on the mailing list of this Department, including those for the school principals (which, however, will not be mailed until the schools reopen). There are still available a limited number of copies for general distribution. Applications for the Yearbook should be made to the Mailing Clerk, Box 331, Honolulu.

RALPH S. HOSMER,
Superintendent of Forestry.

Honolulu, Hawaii, July 31, 1910.

R. S. Hosmer, Esq., Superintendent of Forestry, Honolulu,
T. H.

Dear Sir:—The following report gives the principal work done during the month of July:

PLANT DISTRIBUTION.

	In seed boxes.	In boxes transplanted.	Pot- grown.	Total.
Sold .....	.....	174	320	494
Gratis	3100	3280	888	7268
	<u>3100</u>	<u>3454</u>	<u>1208</u>	<u>7762</u>

The sum of \$29.95 was collected for plants and seed sold, and the same has been deposited with the Treasurer as a realization.

Preparations are being made for the propagating of a large number of trees to fill orders now on file and also for Arbor Day.

SEED COLLECTING.

The two seed boys have been collecting Eucalyptus seed on Tantalus, also Ironwood, and other forest tree seeds around the city.

EXPERIMENT GARDEN, MAKIKI.

The work at the Garden has been confined to the making of seed boxes and benches, transplanting trees and attending to the plants. There are prospects of getting the assistance of a gang of prisoners to help out with the work of propagating the trees for the autumn planting. This we are much in need of, for without some assistance it would be impossible to fill all the orders and have a supply ready for Arbor Day.

NUUANU STATION.

The man at the station will be moved during the month of August to the house opposite the caretaker's house at the dam, and the remainder of the old quarters will be carted to Makiki and there used for building a shed to hold boxes and other material.

Respectfully,

DAVID HAUGHS,
Forest Nurseryman.

Honolulu, Hawaii, August 24, 1910.

R. S. Hosmer, Esq., Superintendent of Forestry, Honolulu,
T. H.

Dear Sir:—I herewith submit a report of the principal work done during the month of August, from 1st to 24th:

NURSERY—PLANT DISTRIBUTION.

	In seed boxes.	In boxes transplanted.	Pot- grown.	Total.
Sold	350	51	401
Gratis	5680	4770	10,450
		<hr/> 6030	<hr/> 4821	<hr/> 10,851

The plants sent to Mr. C. G. Owen to be planted on Re-

serve C, Pupukea Homesteads, are included in the above, and are as follows:

500 pot-grown *Cupressus macrocarpa*
 2000 pot-grown *Eucalyptus robusta*
 4600 *Eucalyptus robusta* in boxes transplanted.

This completes the planting on Reserve C, with the exception of the *Cryptomeria japonica* and Monterey cypress, to be planted around the springs; those will not be ready for several months.

Other work done at the Nursery has been the sowing of seed, making boxes, and transplanting plants.

SEED COLLECTING.

The two men have been collecting on Tantalus and around the city. The demand for seed of forest trees is increasing, and a large quantity of seed of the different species is now on hand. The work will have to be kept up, however, and fresh seed of good quality kept to supply the sub-nurseries and the numerous private nurseries that are being started.

EXPERIMENT GARDEN, MAKIKI.

For the past three weeks we have had a gang of prisoners assisting in the work of leveling off the ground, erecting benches for holding pot-grown trees, also stands for seed boxes and transplant boxes. Owing to the great demand for trees, it would have been impossible without the assistance of the prisoners to have the trees ready in time. It is to be hoped that the prisoners will be allowed to stay with us for a few weeks longer, so that this work may be advanced. The *Bougainvilleas* planted a few weeks ago on the two ridges above the garden are doing nicely, and a number of them are now in flower.

NUUANU STATION.

The man at the station has been clearing away vines from the trees along the road and doing other routine work.

Respectfully submitted.

DAVID HAUGHS,
 Forest Nurseryman.

DIVISION OF ANIMAL INDUSTRY.

Honolulu, Hawaii, September 13, 1910.

Hon. Marston Campbell, President and Executive Officer, Board of Agriculture and Forestry, Honolulu.

Sir:—I beg to report on the work of the Division of Animal Industry since the date of my last report, August 2nd, as follows:

TUBERCULOSIS.

During the month of August a number of the dairy herds which had previously been tested have been inspected and all of the animals which had not been either slaughtered or turned into pastures have been supplied with official ear tags or else branded in accordance with whether they have passed the test or reacted.

With a very few exceptions it may therefore be said that practically all of the animals which have been tested during the past four months are marked in such a way that they can be found again, and a complete record of the test numbers in serial order is being kept in the office so that the owner of each individual animal can be located without effort.

On August 25 to 26 sixty-eight additional head of cattle belonging to Mr. Isenberg were tested at the Waialae Ranch. Of this number 29 head reacted to the test and 1 was found suspicious. The remaining ones were all ear tagged while the reacting ones were plainly marked by cutting off half of the right ear. For some reason or other the manager of this ranch, Mr. Bailey, strongly objected to the branding of the reacting animals and the Committee on Animal Industry has, under these circumstances, permitted the marking of the reacting animals as above indicated with the understanding, however, that none of the reacting animals are to leave the ranch without being branded.

On September 7-8 seventy-four additional cattle were tested on the same ranch with the result that 24 gave a reaction while 50 passed the test. This makes a total of 531 head of cattle tested for Mr. Isenberg with 286 reactors. There still remains between 60 and 80 head on the same ranch, which will be tested this week on the 14th and 15th of September.

On August 22nd Mr. Isenberg's manager notified this office that he intended killing 18 head of reactors including all of the reacting bulls, having received orders from Mr. Isenberg to do so. I immediately went out to the ranch and found that 12 animals had been killed and skinned and that a trench had been dug in which to bury them. A postmortem examination for which I was entirely unprepared, having gone directly to the ranch without bringing any postmortem instruments with me, showed that 11 out of these 12 animals were affected with tuberculosis to a more or less extensive degree, while 6 more which were killed later and after postmortem instruments had arrived also showed the presence of the disease. The one in which no lesions were found had in the meantime been inadvertently buried, the carcass being mistaken for that of another animal, but it is safe to presume that lesions would have been found in case a careful postmortem had been made.

As stated in a letter appended to this report it is Mr. Isenberg's desire that all reacting animals be disposed of with as little delay as possible and regardless of cost, and, further, that no milk be

sold or otherwise disposed of from any of the reacting animals. It is, however, left to the discretion of the manager as to how these animals are to be disposed of with the exception of the bulls which Mr. Isenberg insisted on should be shot.

The absolute destruction of nearly 300 head of animals without realizing anything from the carcass except the hide would entail a loss of several thousand dollars and the subject of how these animals could be most economically disposed of was therefore given full consideration in various meetings and conferences between the members of the Committee on Animal Industry, the manager of the Waialae ranch, and Mr. Isenberg's representative here, Mr. Alexander McBryde. The ultimate result of these conferences led to the acceptance by Mr. Bailey of an offer from Mr. Charles Bellina to take off his hands all such reacting animals which under no circumstances are to be retained, they either being too old or too poor to warrant further use even as breeding animals, Mr. Bellina to destroy them under the supervision of this Board and to utilize the carcasses when rendered innocuous by boiling for feed for his pigs and chickens. The better class of reactors were to be kept by Mr. Bellina in an isolated pasture in the neighborhood of Kahana on this island, their further disposition to be decided on later.

All animals which have been turned over to Mr. Bellina, that is 65 head up to the present date with about 35 more to be turned over to him during this week, have been plainly branded with the official T R brand, and Mr. Bellina has pledged himself to act in good faith and to dispose of none of these animals without the knowledge and consent of this Board. Mr. Bellina has further been permitted to obtain from those dairy owners who have reacting animals on their premises all such animals that they wish to get rid of in order that they may obtain a clean bill of health and a permit to sell milk. These animals are likewise to be kept isolated and a strict account kept of their numbers and the ownership of each individual animal so that compensation may be given the owners when the animals are finally disposed of. The point of this movement is to gather as many of the reacting animals in one place as possible and to assist those dairy owners who are anxious to have a clean dairy to get the tuberculous animals off their premises without sacrificing them completely.

On August 23rd to 24th the dairy herd belonging to Mrs. Davis at Wahiawa was tested by Dr. Edwards, Veterinarian to the Fifth U. S. Cavalry, with tuberculin furnished by this office. His report on the same has been accepted as satisfactory. None of Mrs. Davis' animals reacted to the test.

On September 1st and 2nd two cows were tested for Harold Dillingham, both of which reacted and were branded. On September 9th and 10th 7 cows and 1 bull were tested for Mr. A. M. Brown, of which number 1 cow reacted and was branded, while 6 cows and 1 bull were ear tagged as sound.

Although no definite policy has so far been decided upon by the Board of Supervisors of the City and County of Honolulu in regard to the enforcement of the so-called milk ordinance, it must nevertheless be said that the tuberculosis situation has become an easier solution with each reacting animal that is disposed of and that public sentiment regarding this subject, which was unduly exercised some time ago, is gradually subsiding to its normal level.

The unequivocal position taken by Mr. Isenberg in forbidding the use of any of the milk from his many reacting animals and his determination to eradicate the disease from his dairy ranch without regard to cost has undoubtedly influenced a number of the other dairy owners to follow his example with as little delay as possible. It now seems possible that concerted action on the part of the leading dairymen in raising the price of all milk coming from clean dairies will lead to the voluntary disposition of a number of the reacting animals which are still retained in a number of dairies. If additional assistance from the Federal Bureau as discussed in another part of this report can be obtained, I have no doubt that the City and County of Honolulu at least can be entirely freed from bovine tuberculosis in the course of one and one-half to two years.

CEREBRO-SPINAL MENINGITIS.

On August 31st, Mr. Bull, the manager of the Waipahu plantation, reported by telephone that several of his mules were sick and requested that a veterinarian be sent to his stables without delay. As soon as the live stock on the S. S. Lurline had been inspected I took an automobile to Waipahu, where I found 2 mules dead, 1 dying and 2 severely affected with cerebro-spinal meningitis. Both of these animals have since died.

Unfortunately the true nature of this disease is not known, but there is every indication that it is not transmissible from animal to animal, but is of a purely endemic nature, that is the individual cases develop from the same cause whether this is moulded barley as suggested by some or due to a poison which developed in the system as claimed by others. The treatment is simply dietetic, no special remedy having been found of any value.

The following day, September 1st, Messrs. Alexander & Baldwin requested that a veterinarian be sent to the Mormon Settlement at Laie, stating that they were unable to give any definite information as to what was the matter at that place, the telephone being out of order and the request having been sent by wireless. Suspecting that it might be another outbreak of the same disease as above mentioned I went by automobile to Laie and found upon arrival that it was nothing but a simple case of colic in a recently imported mare and that the animal had recovered before my arrival.

IMPORTATIONS OF LIVE STOCK.

The following live stock has arrived at the port of Honolulu since the last report, August 2nd:

August 3, S. S. Lurline: 34 mules—Schuman. 2 horses—Maui Agricultural Co., W. E. Wall. 6 bulls—F. W. Carter; Herefords for Lanai. 13 cts. poultry—Club Stables; W. F. Ex. Co.

August 5, S. S. Sierra: 2 cts. poultry—Geo. Brown.

August 9, S. S. Wilhelmina: 2 dogs—C. Sullivan; Mrs. Sedgwick. 1 ct. Chix—Club Stables.

August 16, S. S. Hilonian: 24 horses—Chas. Bellina. Among this shipment there were three horses consigned to Mr. Chas. Bellina, which arrived unaccompanied by certificate of mallein test. The total shipment was, however, in charge of a regularly graduated veterinarian. He stated that the three animals in question had not been tested on account of injuries which they had received while being held awaiting shipment in Seattle, and as long as the steamship company were willing to accept them for shipment it was taken for granted that this was the regular course and that the animals could be tested upon arrival here. The mistake rests therefore not with the importer or the shipper but with the steamship company, and a letter from the President of this Board to the said company calling their attention to the violation of the rules of this Board would therefore seem in order. A sketch of such a letter is herewith appended.

The 3 horses were taken to the Animal Quarantine Station and were a week after their arrival submitted to the mallein test, which they all passed successfully, after which they were returned to the owner.

August 16, S. S. Zealandia: 1 dog—Capt. Tripp.

August 18, S. S. Nevadan: 2 horses—City Mill Co. 100 Merino rams—F. W. Carter for Lanai. 19 cows, 1 bull—Kalihi Dairy (Short horns). 2 cts. poultry—Wells Fargo Express Co.

August 26, S. S. Sierra: 3 cts. poultry.

August 29, S. S. Korea: 2 dogs—A. Robinson. 1 ct. poultry—M. Sherman.

August 31, S. S. Lurline: 25 mules—Club Stables 23; City Mill Co. 2. 1 horse—B. Lomba. 4 head cattle—Club Stables, 1 bull; W. E. Wall, 1 cow, 3 horses. 17 cts. poultry. 2 cts. monkeys—Dr. Curry.

Sept. 4, S. S. Hyades: 1 horse—Mr. J. G. Rothwell. 1 ct. Chix—Mrs. F. Turrill.

Sept. 6, S. S. Wilhelmina: 3 dogs; 4 cts. Chix.

Sept. 12, S. S. Nippon Maru: 2 dogs—Mr. Gallagher.

Very respectfully,

V. A. NORGAARD,
Territorial Veterinarian.

DIVISION OF ENTOMOLOGY.

Honolulu, Hawaii, August 31, 1910.

Honorable Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen:—I respectfully submit my report of the work of the Division of Entomology for the month of August.

Of 32 vessels boarded we found fruit, plants and vegetables on 19. The usual care was exercised in the rigid inspection and the following disposal made:

<i>Disposal with principal causes.</i>	<i>Lots.</i>	<i>Parcels.</i>
Passed as free from pests.....	1134	16,069
Fumigated before releasing.....	8	61
Burned	6	12
Total inspected	1148	16,142

PESTS INTERCEPTED.

Probably the most important find for many months was taken this time. It consisted of a bag of sugar cane containing about 50 pieces of cane cut into 12-inch lengths. This cane was without question badly infected with the Fiji disease as we were able to compare it with alcohol specimens at the Hawaiian Sugar Planters' Experiment Station. This disease would raise havoc with the sugar industry of these islands should it ever get a foothold. We took the cane to the Lucas Mill and burned it at once. Here is an illustration of the great necessity to watch the travelers baggage and we are indeed thankful to state that the friendliest coöperation now exists between our Division and the U. S. Customs which really means half the battle. Nothing can now pass into the Territory until we see it and every customs inspector may be rightly considered a deputy of my department, thanks to the great kindness and interest of the Collector of the Port.

One lot of apples from California was very seriously infested with the Codling moth and the shipment was burned. A lot of onion sets from Japan were found infested with Capsids and the lot was fumigated with carbon bisulphide.

Brother Matthias, Inspector at Hilo, reports 15 vessels boarded, 2 carrying vegetable matter and 1 in ballast. There arrived 127 lots and 2242 parcels. Of these all but one lot and two parcels were passed as free from pests, the two parcels were returned on account of being badly infested with the Purple scale.

During the month your Superintendent was able to visit Hilo and go over the work of the inspector, Brother M. Newell. I desire to state that I was greatly pleased to find the Inspector's work very satisfactory. The equipment is good and everything appeared to be kept in a very neat condition. From general appearances of the growth of Hilo we shall have to be prepared to broaden our work shortly and we shall have to provide something in the way of transportation for the Inspector, who now pays his own travelling expenses to and from the wharf, sometimes twice a day.

I also had an opportunity to visit some of the Homesteads in Olaa as far as Mountain View. It was in this district that Brother Matthias liberated the large colonies of *Hippodamia convergens*, the aphid eating ladybird. We found no indication of aphid on the orange trees, where at the time of liberation the new growth was completely covered and the growth badly dwarfed, the trees now look clean and were making new growth. We did not find any *Hippodamias*, but as there was no food for them present, we could hardly expect this.

I also visited parts of Kauai during the latter part of this month and called on Mr. W. D. McBryde, our honorary inspector. I was agreeably surprised to find the new forest plantings looking so well, even new plants, only in the ground a short time, were making good headway. Mr. McBryde states that there were never any shipments of plants going from outside ports to Kauai and that all the shipments pass through Honolulu, this, of course, is the law, but now that homesteads are being established not only in Kauai, but on the other islands, we shall have to be prepared to sooner or later establish a thorough inter-island inspection and I would recommend that this matter be taken up by the Board of Agriculture and Forestry and presented to the incoming legislature. We have now certain pests on some of the islands which do not exist on others. By establishing inter-island inspection it will be possible to prevent the spread of these pests into new territory.

Attached hereto I submit a report of the Assistant Entomologist, Mr. H. O. Marsh, who has made a fairly good start with field experiments.

Very truly yours,

E. M. EHRHORN,
Superintendent of Entomology.

REPORT OF ASSISTANT ENTOMOLOGIST.

Honolulu, Hawaii, August 31, 1910.

Mr. E. M. Ehrhorn, Honolulu, T. H.

Sir:—On receipt of your cablegram announcing my appointment as Assistant Entomologist to the Territorial Board of Agriculture and Forestry I resigned from the United States Department of Agriculture, Bureau of Entomology, and proceeded to Hawaii. I reached Honolulu July 18, 1910, and commenced work at once.

During the past few years I have been working almost exclusively on insects which affect sugar-beets and garden vegetables and after looking about a little I concluded that a study of truck crop insects offered excellent opportunities in these islands.

Accordingly, during the six weeks that I have been employed by the Board, I have devoted my time to a special study of the melon fly (*Dacus cucurbitae*) and the Japanese beetle (*Adoretus tenuimaculatus*). Careful life history studies have been commenced with both of these species and a rather extensive series of field experiments have been undertaken.

The experiments with the melon fly have thus far been confined to the use of poisoned baits, but the tests have not been continued long enough to permit definite conclusions to be drawn. Further experiments will be made against this pest with repellents and possibly also with trap crops as soon as time and equipment will allow.

Several experiments have been made against the Japanese beetle by spraying with arsenicals. Thus far arsenate of lead has not proved effective, but fairly satisfactory results have been obtained with Paris green.

The melon fly and Japanese beetle are exceedingly difficult species to successfully combat. A more complete knowledge of their life history is necessary and it is probable that one or two years of patient study will be required before effective control measures can be devised.

In addition to the two species already mentioned I am also making a study of the life history of *Hymenia fascialis*, *Pontia rapae*, *Hollula undalis* and other insects, destructive to the cabbage and beet. These insects once under control will cause the now discouraged grower to again try his luck in cabbage growing.

Another species which I have given considerable study is *Macrosiphum sanborni*, a reddish plant louse, which at times, is a serious pest on chrysanthemums. I made a series of nine spraying experiments with an oil emulsion, whale-oil soap and two nicotine preparations against this louse. One of the nicotine preparations known as "Black Leaf 40" proved an effective and cheap

remedy when used in combination with whale-oil soap. I shall soon submit a detailed report of these experiments for publication in the "Forester."

In all, during the past six weeks, I have made nineteen experiments. Some of them have been repeated from two to six times and altogether a considerable amount of spraying has been done. With all of these experiments I have personally prepared and applied the mixtures or solutions and noted the results. The experiments have been conducted in gardens controlled by Chinese. These people were at first suspicious, but are gradually becoming interested and one owner has become so impressed with the good results obtained with the "medicines" I have applied to his plants that he has purchased a spraying outfit and will continue to fight the various pests which infest his crops along the lines which I have demonstrated.

Respectfully,

H. O. MARSH,
Assistant Entomologist.

A Washington letter in this issue tells of the rapidly increasing utilization of the national forests by people for summer outings. Before a great while the forests of Hawaii may be added to the category mentioned in the correspondence. Our promotionists have recently been paying more attention to tourist routes through the sublimely picturesque regions of this group. Arrangements can probably be made with the Territorial authorities whereby responsible parties of residents and strangers may have access to the recesses of the forest reserves established throughout the Islands. There is a large organization in Honolulu which has taken up the work of making trails, with rest houses, for mountain exploration.

Office: Brewer Building, Queen St.
Works Iwilei,

Telephone 430.
Telephone 272.

The Hawaiian Fertilizer Co., Ltd.

HONOLULU, HAWAII.

MANUFACTURE AND DEAL IN ALL KINDS OF
Fertilizer and Fertilizer Ingredients
INCLUDING :

Bone Meal,	Sulfate Ammonia,
Nitrate Soda,	Sulfate Potash,
Double-Superphosphate,	Dissolved Guano,
Ground Limestone, etc., etc.	

BOARD OF DIRECTORS :

Chas. M. Cooke, President,	E. F. Bishop, Treasurer,
E. D. Tenney, Vice-President,	J. Waterhouse, Secretary,
Geo. H. Robertson, Auditor,	
W. M. Alexander	
C. H. Atherton,	
E. F. Bishop, Managing Director.	
Norman Watins, General Superintendent	

The products of this company are equal in every respect to any fertilizers sold in any market. In none of the conditions are they ranked by those manufactured elsewhere.

We will be pleased to furnish analysis of the soil of any locality in the Territory and make special fertilizers for different soil products arranging the composition to suit conditions.

Prices and Terms on Application.



Anyone sending a sketch and description may quickly ascertain our opinion free whether an invention is probably patentable. Communications strictly confidential. **HANDBOOK** on Patents sent free. Oldest agency for securing patents. Patents taken through Munn & Co. receive special notice, without charge, in the

Scientific American.

A handsomely illustrated weekly. Largest circulation of any scientific journal. Terms, \$3 a year; four months, \$1. Sold by all newsdealers.

MUNN & Co. 361 Broadway New York
Branch Office, 625 F St., Washington, D. C.

Garden and Farm Tools and Implements

To do good farming you must have up to date tools to work with. We carry a most complete line of everything needed by the small or large farmer, from the smallest hand trowel to the largest cane plow. We also have a good assortment of Hand, Bucket or Barrel Sprayers. Our assortment of Hoes, Shovels, Spades, Mattocks, Rakes, Garden Shears, Lawn Mowers, Garden Hose, and other things that are needed daily about the farm or garden, is most complete and our stock large.

E. O. HALL & SON, LTD.

Board of Agriculture and Forestry.

PUBLICATIONS FOR DISTRIBUTION.

Any one or all of the publications listed below (except those marked *) will be sent to residents of this Territory, free, upon application to Mailing Clerk, P. O. Box 331, Honolulu.

BOARD.

- Report of the Commissioner of Agriculture and Forestry for 1900; 66 pp.
Report of the Commissioner of Agriculture and Forestry for 1902; 88 pp.
* First Report of the Board of Commissioners of Agriculture and Forestry, from July 1, 1903, to December 31, 1904; 170 pp.
Second Report of the Board of Commissioners of Agriculture and Forestry, for the year ending December 31, 1905; 240 pp.; 8 plates; 10 text figures.
Third Report of the Board of Commissioners of Agriculture and Forestry, for the year ending December 31, 1906; 212 pp.; 3 plates; 4 maps; 7 text figures.
Fourth Report of the Board of Commissioners of Agriculture and Forestry, for the calendar year ending December 31, 1907; 202 pp.; 7 plates.
Fifth Report of the Board of Commissioners of Agriculture and Forestry, for the calendar year ending December 31, 1908; 218 pp.; 34 plates.
"Notice to Importers," by H. E. Cooper; 4 pp.; 1903.
"Digest of the Statutes Relating to Importation, Soils, Plants, Fruits, Vegetables, etc., into the Territory of Hawaii." General Circular No. 1; 6 pp.
"Important Notice to Ship Owners, Fruit Importers and Others. Rules and Regulations Prohibiting the Introduction of Certain Pests and Animals into the Territory of Hawaii." General Circular No. 2; 3 pp.; 1904.
"Law and Regulations, Importation and Inspection of Honey Bees and Honey." General Circular No. 3; 7 pp.; 1908.
"The Hawaiian Forester and Agriculturist," a monthly magazine. Vols. I to VI; 1904-1909. To be obtained from the Hawaiian Gazette Co., Honolulu. Price \$1 a year.

DIVISION ON ENTOMOLOGY.

- "The Leaf-Hopper of the Sugar Cane," by R. C. L. Perkins. Bulletin No. 1; 38 pp.; 1903.
* "A Catalogue of the Hemipterous Family Aleyrodidae," by G. W. Kirkaldy, and "Aleyrodidae of Hawaii and Fiji with Descriptions of New Species," by Jacob Kotinsky. Bulletin No. 2; 102 pp.; 1 plate; 1907.
* "On Some Diseases of Cane Specially Considered in Relation to the Leaf-Hopper Pest and to the Stripping of Cane," by R. C. L. Perkins. Press Bulletin No. 1; 4 pp.; 1904.
"A Circular of Information," by Jacob Kotinsky. Circular No. 1; 8 pp.; 1905.
"The Japanese Beetle Fungus," by Jacob Kotinsky and B. M. Newell. Circular No. 2; 4 pp., cut; 1905.
Report of the Division of Entomology, for the year ending December 31, 1905. Reprint from Second Report of the Board; 68 pp.; 3 plates; 10 text figures.
Report of the Division of Entomology, for the year ending December 31, 1906. Reprint from Third Report of the Board; 25 pp.; 7 text figures.
Report of the Division of Entomology, for the year ending December 31, 1907. Reprint from Fourth Report of the Board; 18 pp.; 1 plate.
Report of the Division of Entomology, for the year ending December 31, 1908. Reprint from Fifth Report of the Board; 26 pp.; 2 plates.

DIVISION OF FORESTRY.

- * "Forest and Ornamental Tree Seed for Sale at Government Nursery." Press Bulletin No. 1; 3 pp.; 1905.
* "Suggestions in regard to the Arbor Day Tree Planting Contest." Press Bulletin No. 2; 7 pp.; 1905.
"An Offer of Practical Assistance to Tree Planters." Circular No. 1; 6 pp.; 1905.
"Revised List of Forest and Ornamental Tree Seed for Sale at the Government Nursery." Press Bulletin No. 3; 4 pp.; 1906.
* "Instructions for Propagating and Planting Forest Trees." Press Bulletin No. 4; 4 pp.; 1906.
"Instructions for Planting Forest, Shade and Ornamental Trees." Press Bulletin No. 5; 7 pp.; 1909.
"Na Hoakaka no ke Kanu Ana i na Laau Malumalu ame na Laau Hoohiwahiwa." Press Bulletin No. 6; 8 pp.; 1909.
Report of the Division of Forestry, for the year ending December 31, 1905. Reprint from Second Report of the Board; 77 pp.; 5 plates.
* Report of the Division of Forestry, for the year ending December 31, 1906. Reprint from Third Report of the Board; 123 pp.; 4 maps.
Report of the Division of Forestry, for the year ending December 31, 1907. Reprint from Fourth Report of the Board; 70 pp.
Report of the Division of Forestry, for the year ending December 31, 1908. Reprint from Fifth Report of the Board; 85 pp.

** This Bulletin will be sent only to persons interested in the subject

* Out of print.

Board of Agriculture and Forestry.

PUBLICATIONS FOR DISTRIBUTION—Continued.

DIVISION OF ANIMAL INDUSTRY.

- * "Inspection of Imported Live Stock." Rule 1; 1 p.; 1905.
- * "Inspection and Testing of Imported Live Stock for Glanders and Tuberculosis." Rule 2; 1 p.; 1905.
- "Concerning Glandered Horse Stock in the Territory." Rule 3; 1 p.; 1905.
- * "To Amend Rule 1, Inspection of Imported Live Stock." Rule 4; 1 p.; 1907.
- "Rules and Regulations, Inspection and Testing of Live Stock." Rules and Laws; 11 pp.; Revised; 1910.
- "Quarantine of Horse Stock from California." Rule 8; 1 p.; 1908.
- Report of the Division of Animal Industry, for the year ending December 31, 1905. Reprint from Second Report of the Board; 62 pp.
- Report of the Division of Animal Industry, for the year ending December 31, 1906. Reprint from Third Report of the Board; 41 pp.; 3 plates.
- Report of the Division of Animal Industry, for the year ending December 31, 1907. Reprint from the Fourth Report of the Board; 104 pp.; 6 plates.
- Report of the Division of Animal Industry, for the year ending December 31, 1908. Reprint from Fifth Report of the Board; 44 pp.

DIVISION OF FORESTRY.

FOREST AND ORNAMENTAL TREE SEED AND SEEDLINGS FOR SALE AT THE GOVERNMENT NURSERY.

The Division of Forestry keeps constantly on hand at the Government Nursery, seed and seedlings of the important native and introduced trees. These are sold at prices just covering the cost of collection or growing.

The list includes both forest and ornamental trees, such as Silk Oak, Koa, various species of Eucalyptus, Golden and Pink Showers, Pride of India, Poinciana, Albizzia, etc. The price of the seed varies from 10 to 50 cents per ounce. The seedlings may be had for 2½ cents each, except a few kinds which are 5 cents. Seed of the various palms is also for sale; the price per 100 varying from \$1.00 to \$2.50. All seed is tested before being sent out, which insures its being good.

All communications in regard to seed or trees should be addressed to David Haughs, Forest Nurseryman, Box 331, Honolulu, Hawaii.

RALPH S. HOSMER,
Superintendent of Forestry.

DIVISION OF ENTOMOLOGY.

To give information about insects free of charge is one of the duties of this Division and Hawaiian readers are hereby invited to make inquiry in person and by mail. In order to be able to advise intelligently or send the right kind of useful insects for relief we like and sometimes it is indispensable for us to see the insect suspected or caught in the act, also specimens of the injury. In a tin with a hole or two, or a wooden box specimens may be mailed at 3rd class rates. When specimens are not accompanied by letter *always* write your name and address in the upper left-hand corner of the package. Address all communications SUPERINTENDENT DIVISION OF ENTOMOLOGY, P. O. BOX 331, HONOLULU, HAWAII.

EDW. M. EHRHORN,
Superintendent.

VOL. VII.

NOVEMBER, 1910

No. 11

Price, 10c. Per Copy; Per Annum, \$1.00; Foreign, \$1.25.

THE
Hawaiian Forester

AND

Agriculturist

A MONTHLY MAGAZINE

OF

Forestry, Entomology and Agriculture

ISSUED UNDER THE DIRECTION

OF THE

BOARD OF COMMISSIONERS OF AGRICULTURE
AND FORESTRY.

PUBLISHED MONTHLY.

Entered as second-class matter at the Post office, at Honolulu, Hawaii.

ADDRESS ALL COMMUNICATIONS TO

DANIEL LOGAN,
EDITOR "THE FORESTER,"

P. O. BOX 366,
HONOLULU, H. T.

For business relating to advertising or subscriptions, address

HAWAIIAN GAZETTE CO., LTD., Publishers,
VON HOLT BLOCK, 65 S. KING ST., HONOLULU, HAWAII.

Albert Waterhouse

David Kapihe, *Forest Ranger for Tantalus.*

Wm. Robb, } Lahaina, Maui.

A. R. Glaizyer, *Deputy Territorial Veterinarian for Kauai.*

Miss Ella K. Dayton

THE HAWAIIAN FORESTER AGRICULTURIST

VOL. VII

NOVEMBER, 1910

No. 11

AN AUSTRALIAN EXPERIMENT FARM.

Many pages are occupied in the September number of the Agricultural Gazette of New South Wales with an account of the experiment farm at Wagga. This is under the general heading, "Our Experiment Farms," indicating that the state possesses a plurality of those institutions. From a description of the farm some facts may be taken for consideration in Hawaii, where district experiment farms will, it is hoped, one day be established for the benefit of beginners in agriculture here, whether lads of the islands or mature farmers from abroad. What strikes us in the Australian example is its simplicity, whereby it keeps within economic lines attainable on the average farm of its locality.

The Wagga experiment farm was established seventeen years ago. It comprises an area of 3228 acres, about five miles from the town of Wagga. Some 1200 acres are utilized for cropping as a mixed farm, 95 acres for fruit culture and the remainder for grazing purposes. About 65 acres are allotted for experimental work with wheat and other cereals, fodders and vegetables. There is accommodation for 53 students, which is fully availed of, and they are instructed in the principles of agriculture and horticulture, field operations, the management of stock, orchard work and fruit-drying, and the theory and practice of agriculture generally. In addition to information sown broadcast on special occasions, much specific instruction is given to farmers of the surrounding district, in response to frequent inquiries made personally, by telephone or by letter, and Wagga farm is regarded as a common asset of those who earn their subsistence from the soil.

No system of irrigation is adopted, and all crops, fruit and stock are dependent on surface catchment of water. During the past thirteen years the annual rainfall recorded at the farm has averaged 16.49 inches. The stock at present on the farm includes 82 head of horses, 125 head of dairy cattle, 1610 sheep, 69 pigs, 225 fowls and 89 turkeys. A special feature of the management is the system of book-keeping, under which the most minute details of costs and returns are recorded. Such intricate and laborious clerical work is not suggested to farmers, but its value

on a large experiment farm is obvious, as a demonstration or experiment loses much of its significance without a knowledge of the cost.

The operations are designed to give practical instruction and demonstration in the best methods within the reach of the average farmer of the district. With this end in view, appliances and machinery have been kept to the standard of economy reasonably attainable by those whose capital has to be replenished by the fruits of their labor. For instance, the shearing shed is fitted up each year in a building which is used during the remainder of the year for other purposes. This avoids the maintenance of an expensive permanent establishment; and, moreover, the fitting up of the yards, etc., is an annual lesson to the students.

Particulars are given in the article of the operations of the farm with results. Goodly profits are shown for the many paddocks into which the farm is divided. Last year the farm orchard yielded a net balance of about \$1890.

Very interesting is a description of the system for fighting bush fires which is maintained on the farm. This is always available for assisting neighboring settlers in need as well as suppressing any outbreaks on the farm. A fire cart is always ready at the farm, with a large supply of hide beaters, wire-cutters and other appliances kept in the cart ready for use. There is no special fire brigade, but certain students are chosen to work under directions. During the dangerous months two fire-cart horses are specially kept in the stables, and are not allowed to be taken away for any other purpose. Keys of all the gates of the farm are left available, so that stock can be readily mustered, and plans are fully organized for meeting fire at any point. On receipt of telephonic or other intimation of a fire within ten miles of the farm, the cart is sent out. In the event of an outbreak on the farm, neighbors would naturally be expected to help the staff. When a fire is seen, observations are taken with instruments at the farm, and information as to similar observations is obtained from a neighboring station by telephone. The readings from the two different points are then plotted on a map with threads, the junction of the threads showing the position of the fire. Everybody within reach of the telephone is informed at once. By communicating with headquarters of bush fire brigades in different localities, the farm officials assist in enabling all available forces to be concentrated at the seat of the fire without delay.

In concluding the summary of the work done at Wagga experiment farm—the largest under the control of the department, situated in the center of the granary of the state—the author (Mr. J. E. O'Grady) says: "As the years pass by, Riverina becomes more and more valuable to New South Wales and to the Commonwealth—a home for those who wish to leave the city and rear their children under healthy conditions of agricultural life. What irrigation can do for New South Wales has yet to

be proved, but that mixed farming—wheat and sheep—can give us millions of desirable citizens is amply demonstrated by the success which has attended the efforts of Riverina farmers during the past few seasons. The state is passing from a large lonely sheep-run, with a city at its gate, into an aggregation of cultivated paddocks dotted with such prosperous inland towns as Wagga."

Surely here is inspiration for the promoters of diversified agriculture in Hawaii. If not millions at least thousands of citizens ought to find comfortable homes upon lands now unproductive and desolate in these islands, raising a great variety of products for which Hawaiian climate and soil are congenial.

MAKING THE LAND WORK.

In the third quarter of the last century the vineyards of Europe were overtaken by the phylloxera, a minute insect which lives upon the roots of the vine and eventually destroys it. At first it appeared as though no means could be found to combat the pestilence, but gradually various remedies have been discovered, of which the most widely applied has been the employment of American species of vine as the underground stocks, upon which the old varieties esteemed for making wine were then grafted. The American vine is strong enough to resist the attack of the parasite; it even confers a new vigor and yielding power upon the more delicate vintage grape that it carries, so that by its help many of the old European vineyards have not only been regenerated, but also made to produce more wine per acre than before the advent of the phylloxera. But the more famous vineyards, where are grown the *grands crus* that bear a name all the world over, have hesitated to use the American stock, fearing such a deterioration in the quality of the grape as would never be compensated for by any increase of quantity. The remedy against phylloxera on which they have chiefly relied has been the injection into the soil of small quantities of carbon disulphide, a volatile liquid giving rise to a heavy poisonous vapor. It was found that this vapor diffused through the soil and killed the phylloxera, while the root of the vine took no harm. In this way the phylloxera can be kept in check if not actually stamped out, but the expense of the process limits its adoption except in the most valuable vineyards. The point of this story is that a certain Alsatian vine-grower before 1894 made the observation that land which had thus been treated with carbon disulphide became more productive than it was before, even when the destruction of the phylloxera was left entirely out of the question. But this observation remained unappreciated, just like the similar records of the gain in fertility brought about by heating the soil to the temperature of boiling water. However, confirmatory evidence grad-

ually accrued, until such scientific men as concern themselves with the soil have within the last few years become convinced that there was a real and novel set of phenomena to be explained. some of the United States station workers even began to advocate the steam heating of soil destined for the growth of plants in greenhouses; they maintained that not only was freedom from certain fungoid diseases and animal pests thus secured, but that the productiveness of the soil was sufficiently raised to pay for the treatment.—A. D. Hall, in *Harper's Magazine* for October.

NEED FOR ORGANIZED FOREST FIRE PROTECTION AMONG PRIVATE OWNERS.

Washington, September 30.—One of the lessons which will finally be drawn from the trying experience of the present forest fire season, in the belief of officials of the U. S. Department of Agriculture, is the need of wider organization among private owners of timber to safeguard their holdings.

It is pointed out that already in the Northwest, both on the Pacific Coast and in Montana and Idaho, timberland owners have formed themselves into associations which assess the members on an acreage basis and thus meet the cost of maintaining a regular patrol and fire-fighting organization. Only by getting together can private owners usually assure themselves protection, for fire is no respecter of boundary lines and the man who undertakes to keep it out of his own timber will want it kept out of his neighbor's too. Wherever possible the government's forest officers coöperate with the force put in the field by the associations, so that the employees of the government and those of the private owners are handled practically as a unit in fighting the common enemy.

This coöperation is advantageous to both sides. Protection of the national forests necessarily carries with it a good deal of protection of adjoining or interior holdings. If the private owners would everywhere shoulder their reasonable share of the burden, the public would gain both through more general forest conservation and through relief from the necessity of paying for the protection of private timber in order to protect its own.

THE FENCE POSTS OF IOWA.

Washington, September 30.—The U. S. Department of Agriculture estimates that the farmers of the single State of Iowa use every year \$1,400,000 worth of new fence posts, which cost the equivalent of \$600,000 for setting them in the ground. Further, the department officials believe that a part of this expenditure might be saved.

The opportunity for economy is found, first, in using the kinds of posts which, taking into account both cost and durability, are cheapest in the long run, and, secondly, by treating the posts to prevent decay, particularly those which decay most quickly. When a farmer sets a post which will have a comparatively short life, he loses not only through having to buy a new post but also because of the additional labor involved in setting it. It is true that in both cases no money outlay may be involved, for he may set the posts himself, after getting them from his own woodlot. Of the posts used last year in Iowa, seventy per cent., it is estimated, were grown on the farms where they were used, or were obtained from other farmers or woodlot owners, and only thirty per cent. were bought from lumber dealers. Nevertheless, the farmer is out his labor and the part of the product of his woodlot which is used up, even though he does not pay out any cash.

The average life of a fence post is stated to be fourteen years and the average cost 13.7 cents. There is, however, great difference in the lasting properties of different woods. Preservative treatment increases the life of all wooden posts and more than doubles the period of usefulness of those which are mostly sapwood. The two million dollars spent yearly by Iowa farmers in buying and setting fence posts might be materially lessened by putting into practice the well known methods of wood preservation. It costs much less to treat a post than to buy a new one and set it in the ground, and in addition much wood could be saved for other purposes. The Department of Agriculture has made a special study of practical methods of preserving farm timbers, so that it is able to inform interested inquirers how to do this for themselves.

Forest products to the value of \$51,161 were shipped from Hawaii to the United States mainland in 1909, as compared with \$18,912 in 1908 and \$13,273 in 1907.

In our Washington letter on "The Fence Posts of Iowa," we have struck out comparisons of different woods, as those mentioned are mostly unknown here. The advice regarding economy in fence posts will no doubt be useful to agriculturists, forest growers and ranchmen in Hawaii.

✓ Honey shipments from Hawaii to the mainland are not deemed worthy of mention by name in the statistics of the department of Commerce and Labor. The information is given in statistics just received from the department of Agriculture. In 1909 the value of honey shipped hence to the United States was \$50,412, as compared with \$30,842 in 1908 and \$26,680 in 1907.

QUESTIONS ABOUT GOATS.

I have just read with interest your article on goats, page 797, and would like to ask a few questions. What breed would you recommend for "meat and mohair?" Where can they be had? Will they eat and eradicate horse nettle? Is there a ready sale for their meat?

E. A. P.

Pennsylvania.

ANS.—The Angora is the best breed of goats to keep for mohair and meat. The fleece usually pays for all the trouble and cost of keeping them. The does bear twins, and the annual increase is about clear profit. There is need of close attention to them at kidding time, for the does are not very faithful mothers at first. They should at such time be kept in an enclosure where they can be seen frequently by the attendant, who must see that each doe owns her kids and suckles them for a few days. Then they may be turned out to browse with the common herd. The meat is excellent and as good as lamb, for which it is often sold in the dressed form, so I have been told by meat dealers. I have eaten it frequently and know that the flavor is delicious. I think it resembles young venison. Goats will eat about every weed that grows, and I think they like the "horse nettle," although I am not sure of it. There are many who have goats for sale, both East and West, and they advertise in some of the rural papers. The Bureau of Animal Industry at Washington, D. C., may be able to direct those wanting goats to the right places to buy them. Any common breed of goats will destroy weeds as well as the Angora, but they pay the best because of the mohair.—Rural New Yorker.

TUBERCULOSIS AND FEVERED CALVES.

From Henry County, Ky., come letters telling that dairy cows tested for tuberculosis have since failed to drop calves, or in the few exceptional cases, the calves dropped were weaklings that died within a few hours. The same bulls were used as in previous years when the cows were reliable calf producers. This report is based on the experience of a half dozen farmers with an aggregate of something like 25 cows. Is the explanation to be found in the testing, or in the material used, or is it just a freak of nature?

MORTON WATKINS. \

Tuberculin could not possibly cause the results mentioned. It is perfectly harmless to an animal that is not affected with tuberculosis. The trouble mentioned merely is incidental, and apt to happen at any time, and especially when cows happen to become infected with the germs of contagious abortion. A few cases are

on record where cows have suffered from pus infected by injections of tuberculin which had become decomposed, or where dirty injection needles were employed. Fresh tuberculin always should be used, and with sterilized needles and with due care to sterilize the skin at point of injection.

A. S. A.

—Rural New Yorker.

BOARD OF AGRICULTURE AND FORESTRY.

Minutes of the meeting of the Board of Commissioners of Agriculture and Forestry, held in the Board room, at the Capitol, on Wednesday, September 14, 1910, at 2 o'clock p. m.

Present: Marston Campbell, President and Executive Officer; Messrs. H. M. von Holt and Albert Waterhouse, members; Edw. M. Ehrhorn, Superintendent of Entomology, and Dr. V. A. Norgaard, Territorial Veterinarian.

Entomology—Thimble Berry.

Mr. Ehrhorn reported that on his return from Kauai he was handed a letter from Mr. Alfred Carter, by order of the Board, and about that time he received a letter from his assistant at Hilo in regard to the same matter—i. e., a means for the eradication of the thimble berry. Mr. Ehrhorn read to the Board Bro. Matthias Newell's letter bearing on this matter, dated September 11, to which he has replied, informing Bro. Newell that the specimen he sent was rather dry and requesting him to secure and send growing plants in earth for the full determination of the character of the disease. When these are received, the matter will then be taken up with Dr. H. L. Lyons of the Hawaiian Sugar Planters' Association, and when definitely decided as to what this fungus is he will be able to conclude what can be done to prevent the spreading of this dreaded plant from one part of the country to another.

It was suggested that Mr. Ehrhorn keep in touch with Mr. Alfred Carter, who is not only willing to give his personal, but also his financial, aid in the securing of a fungus or parasite for the definite eradication of the thimble berry.

It was voted that this entire matter be turned over to the Superintendent of Entomology and that authority be given him to proceed with extensive investigations of the thimble berry parasite and fungus.

Brother Matthias Newell's Traveling Expenses.

In regard to Bro. M. Newell being limited for funds with which to carry on the work he has in mind to accomplish,

Mr. von Holt moved that he be allowed not to exceed \$25 each month, to spend as he sees fit, for traveling expenses in connection with his work of inspection for the Division of Entomology or also special forestry work; this allotment of \$25 to be in addition to his salary and other amounts he receives at present for various purposes, it to be made clear to him that the allowance is not accumulative and that for every expense incurred he is to secure a receipt and submit bill for payment on the usual official forms, by the end of every month. The motion was seconded and carried.

It was also voted that Mr. Ehrhorn be authorized to instruct Bro. Newell that on receipt of his orders for such materials as he may be in need of to carry on his work, as he has been charged excessive retail prices, if it is at all possible to procure the same here in Honolulu, they will be honored and the goods promptly forwarded to him.

Mr. Ehrhorn reported that Bro. Newell has been doing very hard work and has accomplished excellent results with what little money he has had available, and the Board considered that he should be properly encouraged.

Animal Industry.

Mr. Waterhouse asked the Territorial Veterinarian if he was still continuing the work of tuberculin tests on Board of Agriculture and Forestry time and money without any assistance from the County.

The Doctor replied that he was, and said that the Board of Supervisors seemed to think this matter is one which really should be handled entirely by the Board of Agriculture and Forestry without their aid. Dr. Norgaard stated that all requests for tests have been promptly complied with by the Board of Agriculture and Forestry; that time and labor could be saved if applications from private parties coming in could be held until a number of them are on hand. the animals brought together and the testing done at one and the same time and place—taking them here or there as requests come in requires ten visits at each place and means a lot of time consumed in traveling back and forth, but he has accepted all cases and attended to each as soon as he could. It takes really three people to do the testing, and a great many cases take him away from Honolulu, and the Doctor added that this means extra expense in the way of transportation and subsistence in cases where he or his representatives cannot return to the city.

Mr. Waterhouse made motion that, even though the Board cannot at the present time get the coöperation of the Board of Supervisors in the protection of milk consumed in the city, the Territorial Veterinarian be instructed to continue

his present work of testing as fast as practicable in all cases where the owners of cattle will agree to satisfactorily dispose of the diseased animals. Mr. von Holt seconded the motion, which was unanimous.

The regular routine report of the work of the Territorial Veterinarian was accepted and copy of same given to the press for local notice.

Communications.

President Campbell read a letter dated September 14, submitted for his signature by the Territorial Veterinarian, to be sent to the Matson Navigation Company, which was approved.

Dr. Norgaard also submitted for the Board's approval letter to Dr. A. D. Melvin, Chief of the Bureau of Animal Industry at Washington, D. C., dated September 14, giving the tuberculosis situation in general, which was in response to his request of September 11, for data pertaining to the methods of control and eradication of tuberculosis in the Islands, and other communicable diseases of animals and sanitary milk inspection. When this was read by the President, the members of the Board voted that the same be approved after the changes suggested had been made, with the request that when the letter had been signed by the President it be then forwarded to the Governor for his approval.

Publication Eucalyptus Report.

The Chairman read letter to T. D. Woodberry, the Assistant District Forester of San Francisco, dated September 6, acknowledging their communications with reference to the printing of Louis Margolin's report setting forth that the Board of Agriculture and Forestry had never refused to print the report on Eucalyptus, but had simply asked them if they could not see fit to print the report for this Board on account of the present unfortunate financial condition and the necessity for the curtailing of all expenses.

Bird Permit.

The Chairman read letter from Miss Annie M. Alexander of September 5, in regard to the Board's refusal to issue permit to collect Hawaiian birds, and asking for the return of the two copies of her bond for \$200 filed here last March; reply thereto dated September 13, complying with her request, was also read.

Division of Animal Industry.

REPORT OF THE TERRITORIAL VETERINARIAN.

Hon. Marston Campbell, President and Executive Officer,
Board of Agriculture and Forestry, Honolulu.

Sir:—I beg to report on the work of the Division of Animal Industry since the last meeting of this Board on September 14th.

Tuberculosis Situation.

On September 14 and 15 the remaining cattle belonging to the Isenberg Dairy, a total of 74 head, were submitted to the tuberculin test with the result that seven showed typical reaction and were branded, while 26 head, all young heifers which had been brought down from the mountains a few days previously, gave doubtful reaction—that is, the preliminary temperatures were too high to warrant their being injected. These 26 animals were ear-marked and ear-tagged in such a way as to be easily identified, and will be retested as soon as convenient and when they have become familiar with their new surroundings.

On September 26th to October 1st, 230 head of cattle were tested at the Mōkuleia Ranch of the Pond Dairy. Of these animals only eight head reacted to the test, none were found suspicious, and 222 head were branded with official ear-tags as being sound. Of the eight reactors, one animal, No. 64, was killed, and was found on post mortem examination to be extensively tuberculous. This animal had been tested by me four years ago, when it gave a doubtful reaction, and has since that time been tested repeatedly by Mr. Pond, each time giving a doubtful reaction. As stated, the animal was found affected with tuberculosis of the lungs and of most of the lymphatic glands of the head, neck and chest, the lesions being old and calcified. This animal has always been in fairly good condition and showed no physical symptoms warranting her destruction on a doubtful reaction, and she has undoubtedly been a continued source of infection during the years she has been retained in the herd.

At the present date the tuberculosis work sums up as follows:

Total number tested.....	1715
“ “ suspicious.....	46
“ “ reacted..	510

Percentage of reactors and suspicious ones 32.42.

The Assistant Territorial Veterinarian and the Live Stock

Inspector will leave for Kahuku tomorrow and will test all dairy animals between Kahuku and Waialua and from Waialua to Pearl City, endeavoring to get together as many animals as possible at various stations and to test all animals which the owners are willing to or can be persuaded to have tested regardless of whether they have made official application for testing or not. It is estimated that there will be between 50 and 60 head at Kahuku, about 20 to 30 head around Waimea, and 50 to 60 head at Waialua.

From the Island of Maui the Deputy Territorial Veterinarian reports the testing of the Grove Ranch dairy herd, 13 head in all, of which five gave typical reaction. The reactors will be destroyed and the carcasses passed on by Dr. Fitzgerald, who will report the post mortem results to this office.

On Hawaii, Dr. Elliot has tested a number of private herds and has destroyed three reactors, all of which were found on post mortem to be badly affected with tuberculosis.

As indicated in the appended letters, there have been sent 500 official ear-tags and two pair of tongs for applying the same to each of the three deputy territorial veterinarians, and a complete record will be kept of all animals tested by these gentlemen in their respective districts.

It is recommended that the sum of \$100.00 per month be set aside to defray the expenses of this Division while finishing the work of testing and retesting the dairy animals on this island.

Since the last report the milk from four different dairies has been examined as to its bacterial content, with the result that the samples were found to contain bacteria ranging in number from 50,000 to 18,900,000 per cc. A report on this work has been forwarded to Mr. J. A. Rath, Secretary of the Milk Commission.

Inspection Service.

Under date of September 10th the inspector in charge at the port of San Francisco, Dr. George S. Baker, informed me that the S. S. Hilonian, leaving San Francisco on September 11th, would bring a consignment of live stock for the Volcano Stables, Hilo, consisting of 15 mules and 6 horses, and calling my attention to the fact that these animals had been shipped against his protest, he refusing to approve of the test charts, as required by the regulations of this Board. As a reason for this action he states that the animals in question had been tested together with a number of other horses and mules, an unusual high percentage of which gave typical reaction to the mallein test and that, consequently, there was a possibility of some of the non-reacting animals having become infected while in contact with the reactors, even

though none of these showed any symptoms of glanders during the test.

The correspondence pertaining to this matter, and which is herewith appended, which, after consultation with the Matson Navigation Company's agent here, decided that the Territorial Veterinarian should go to Hilo and meet the Hilonian's shipment upon its arrival. A wireless message was sent to the Deputy Territorial Veterinarian in Hilo, instructing him not to allow the landing of the animals until my arrival. On September 20th I left for Hilo and found that the Hilonian had arrived the night previous and that the animals had been retained on board. A careful examination of the same failed to reveal the presence of any suspicious symptoms, and the animals were landed and taken to the quarantine station, where the six horses were placed in separate stalls, while the 15 mules were allowed to run in an isolated pasture inside of the quarantine premises. The animals will not be released from quarantine until the inspector in charge is satisfied that they are free from any infection, and I have suggested that the six horses be retested in any event before being released, whether they show symptoms of the disease or not. The mules will, in case any of them have become infected before shipment from San Francisco, undoubtedly develop symptoms of the disease before the expiration of the quarantine period, and it will, therefore, not be necessary to retest them unless suspicious symptoms appear.

As will be seen from the appended correspondence, the agents of the Matson Navigation Company admit that the Captain of the Hilonian should not have accepted the consignment in question for shipment over the protest of the Federal inspector, and the two accompanying copies of letters addressed by the said agents to the Matson Navigation Company of San Francisco, California, and to the masters of the various vessels of this company will explain the action taken by this company to prevent a repetition of this incident and to insure a stricter conforming by the company's officers with the rules and regulations of this Board. This action on their part would seem to be satisfactory and would obviate the necessity of altering or amending the said rules and regulations, a contingency which had been considered at a meeting of the Committee on Animal Industry.

In response to a letter from Dr. Baker, dated June 13, 1910, and which is appended hereto, complaining about the difficulty in identifying mules and horses tested for the Territory of Hawaii, there has been forwarded to Dr. Baker 500 aluminum ear-tags bearing the following legend: "Territory of Hawaii, Mallein Tested, Passed," and a serial number. One equal number of tags have been forwarded to the Federal

inspectors in charge of the ports of Seattle, Washington, and Portland, Oregon, respectively, with the request that all horse stock intended for shipment into this Territory be provided with ear-tags when the last temperature of the test is taken. This will greatly facilitate the identification of the tested animals, both when they are presented for shipment from the mainland ports and after their arrival here.

Importation of Live Stock.

The following live stock has arrived in the Territory since the last report:

September 16—S. S. Sierra,	1 horse
	4 monkeys
	2 dogs
September 19—Bark Andrew Welch,	2 dogs
September 28—S. S. Lurline,	3 horses (1 stallion)
	20 Merino sheep
	13 Hereford bulls
	2 Berkshire pigs
	1 dog
	12 crates poultry

The 20 Merino sheep were beautiful animals and were imported by Mr. Robert Hind of the Puuwaawaa Ranch on Hawaii. The Hereford bulls, which were also high-class animals, were consigned to the Puakea Ranch on Hawaii (8 head) and the Cornwell Ranch on Maui (5 head).

In this connection it may be well to state the capacity of the new quarantine station on the Beach Road will be tested during the next week or two, as two large shipments of horse stock are expected to arrive from San Francisco. Mr. Charles Bellina of the Club Stables expects 75 to 80 head of horses, while the same number of mares and two jacks will arrive on the next Hilonian for the Lanai Ranch. It is believed that this number of animals can be accommodated unless other shipments should arrive in the meantime, in which case it may become necessary to utilize the hog cholera division for some of the horse stock.

Very respectfully,

V. A. NORGAARD,
Territorial Veterinarian.

Division of Forestry.

REPORT OF SUPERINTENDENT OF FORESTRY.

Honolulu, Hawaii, September 30, 1910.

Board of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—I have the honor to submit as follows the report of the Division of Forestry for the month of September, 1910:

Planting Plans.

At the second National Conservation Congress, held recently at St. Paul, Mr. Henry S. Graves, the Chief Forester of the United States, said: "The practice of forestry by private owners is a public necessity." Acting on the spirit underlying this statement, the Division of Forestry devotes considerable time and energy to assisting individuals and corporations who wish to plant trees. During September a comprehensive plan for forest work on Lanai, the result of a visit made to that island at the end of August, was drawn up by the Superintendent of Forestry and submitted to the officers of the Lanai Company.

In this connection it may be noted that the Molokai Ranch Company has started to put into operation the recommendations contained in the planting plan prepared for that ranch a few months ago. Satisfactory progress is also being made in getting trees ready at the Nursery for the Parker Ranch for planting the portion of the Kohala mountain above Wai-mea village, Hawaii.

On the side of furnishing trees at cost for planting on private lands, there are now on file with the Division of Forestry orders for over 300,000 forest trees, which are wanted for planting this fall and early winter. These orders will be filled as rapidly as possible, but the later ones will have to take their turn. This leads me to repeat a suggestion made in an earlier report, that it will be mutually of benefit if those desiring trees will notify the Division of Forestry of their wants some months in advance of the time the trees are desired. It takes from two to three months, with some species more, to get seedlings to the proper size for sending out from the Nursery. Consequently unless it has advance notice the Division of Forestry can hardly be expected to fill large orders without some delay.

Arbor Day.

The plans for the Annual Arbor Day free distribution of trees are well advanced. Ordinarily trees are sold from the Government Nursery at cost price. Each November, for

Arbor Day, two dozen trees are given free to all applicants who will agree to plant and care for them. This year special preparations have been made to distribute a large number. At the Government Nursery about 50,000 are being made ready. At the Hilo Nursery, under the direction of Bro. Matthias Newell, about 15,000; at the Nursery at Homestead, Kauai, which is under the charge of Mr. Walter D. McBryde, about as many more. By arrangement with sugar plantation managers and others, temporary substations for growing or giving out trees have been established at Wailuku, Makawao, and Hana, Maui; at Kohala and Honokaa, Hawaii; at Pukoo, Molokai, and at Kapaa and Hanalei, Kauai. Other places not easily reached from these substations will be supplied from Honolulu.

Special arrangements have been made for supplying trees for school grounds throughout the Territory. Altogether, 1910 should be a banner year for Arbor Day tree distribution.

Botanical Explorations.

Mr. J. F. Rock, the Botanical Assistant of the Division of Forestry, has had a busy summer in the field, gathering much interesting herbarium material which will be worked up in coming months. Following a trip to Lanai and West Maui, Mr. Rock was in Honolulu for a short time early in September. He is now on Maui on the western and southern slopes of Mt. Haleakala.

In addition to plant material collected locally, the herbarium has recently been enriched by specimens of plants from other countries bordering on the Pacific, received in exchange.

Very respectfully,

RALPH S. HOSMER,
Superintendent of Forestry.

FREE TREES FOR ARBOR DAY.

The following notice in English, in Portuguese and in Hawaiian has been printed in Honolulu newspapers. Similar notices have appeared in the papers on the other Islands. Thanks to the interest of the newspapermen, the fact that trees are being given away is getting good publicity.

Notice is hereby given that all persons in and about Honolulu who desire trees for Arbor Day planting may obtain not to exceed 24 each, Free, by making application not later than October 25, 1910, to Mr. David Haughs, Forest Nurseryman, Box 207, Honolulu, Oahu.

The kinds available are Eucalyptus, Ironwood, Silk Oak, Monterey Cypress, Golden, Pink, and Pink and White Showers, Poinciana and Jacaranda. Each

applicant may obtain 24 trees free, provided, however, that not more than 12 shall be flowering trees. Applicants must call for their trees at the Government Nursery on King street, Honolulu, and must bring containers in which to remove them. The trees will be given out during the second week of November, but applications must be filed before October 25, 1910.

RALPH S. HOSMER,
Superintendent of Forestry.

Honolulu, T. H., September 30, 1910.

NURSERYMAN'S REPORT.

Honolulu, Hawaii, Oct. 5, 1910.

Mr. R. S. Hosmer, Superintendent of Forestry, Honolulu,
T. H.

Dear Sir:—Since my last report, which was August 24, the principal work done since that date to the end of September is as follows:

Nursery—Plant Distribution.

As previously reported, up to and including August 24, the distribution for that part of August amounted to 10,851 trees, from the 24th to the end of the month a total of 1982 trees, making the total for the month of August 12,833. This is divided as follows:

August.

	In Seed Boxes.	In Boxes Transplanted.	Pot- Grown.	Total.
Sold	1,950	345	2,295
Gratis	5,660	4,878	10,538
				<hr/> 12,833 <hr/>

Plant Distribution for September.

	In Seed Boxes.	In Boxes Transplanted.	Pot- Grown.	Total.
Sold	19,000	1,400	534	20,934
Gratis	500	3,700	2,734	6,934
				<hr/> 27,868 <hr/>

The principal work at the Nursery has been getting plants ready for Arbor Day, also sowing seed and getting ready

some of the large orders now on file. At present we have on file orders for over 300,000 trees, those, of course, are to be shipped in the seed boxes and transplanted by the applicants into other boxes and pots after they are received. With the present help it may be impossible to fill all these large orders and also keep up the general distribution; however, we will do what we can.

Collections for August amounted to \$12.30, and for September \$39.25; all of which has been deposited with the Treasurer as a Government realization.

Collection and Importation of Seed.

The two seed men have been collecting around the city and on Tantalus. Several pounds of koa seed were collected, also about eight pounds of *Eucalyptus robusta* and other *Eucalyptus*.

From Mr. Gerrit P. Wilder we have received from Belgium a package of willow cuttings, also a quantity of seed of economic and ornamental plants. These are being taken care of in our propagating houses. Several packages of seed have also been received from a number of botanic gardens in exchange for seed sent from here.

Makiki Station.

The principal work at this station has been getting trees ready for Arbor Day. A new shed had to be built to hold the box shooks from San Francisco through Lewers & Cooke. Wood for 5000 boxes was received cut into lengths ready to nail together. The getting of the wood in this shape will be a great saving in labor compared with the former plan of making boxes out of empty grocery boxes.

Nuuanu Station.

The man at the station has been moved down to the house below the dam and the remainder of the old quarters taken down and the wood moved to Makiki. Clearing away vines from the trees and looking out for estrays has constituted the principal work done.

Yours respectfully,

D. HAUGHS,
Forest Nurseryman.

Division of Entomology.

REPORT OF THE SUPERINTENDENT OF ENTOMOLOGY.

Honolulu, Hawaii, Oct. 1, 1910.

Honorable Board of Commissioners of Agriculture and Forestry, Honolulu.

Gentlemen:—I respectfully submit my report of the work of the Division of Entomology for the month of September.

Of 34 vessels boarded we found fruit, plants and vegetables on 13. The usual care was taken in making a rigid inspection of all shipments, and the following disposals were made:

Disposal with principal causes:	Lots.	Parcels.
Passed as free from pests.....	1,082	15,038
Fumigated before releasing	6	33
Burned	13	13
Returned	1	15
	<hr/>	<hr/>
Total	1,102	15,099

Pests Intercepted.

From Japan in several lots of sand pears we found the larva of a lepidopterous borer, probably *Nephroterys rubrizonella*. The work of this species resembles that of the Codling moth. These pears were also badly infested with scale insects.

Fifteen boxes of lemons from San Diego County were found badly infested with the Purple scale and the Greedy scale, and the shipment was ordered returned. The consignees of these goods had received due warning not to import such fruit before and had ample time to consider the matter.

In a lot of plants from Japan we found in the soil the larva of a Scarabeid beetle resembling the larva of the Japanese beetle. I have the larva in a breeding cage to obtain the adult. Several small lots of plants were found slightly infested with scale and were thoroughly fumigated before releasing.

We were able to send two strong colonies of fly parasites to Midway Island, consisting of fly pupae containing the larvae of *Eucoila impatiens* and *Spalangia hirta*. Mr. Morrison, Superintendent of the Cable Office, sent us samples of flies from Midway, and we only found the common house fly and a blow fly, *Calliphora* sp., among the sending. The common field ant, *Tetramorium guineense*, is also on the island. We shall probably receive further sendings of flies and other

insects on the return of the Florence Ward, and shall know better what to recommend after seeing what pests they have to contend with.

We also sent a lot of parasites of the Black scale (*Saisettia nigra*) to the Nahiku Rubber Plantation. Mr. Austin reported that the pest was quite bad there. This parasite is very efficient on the scale found over the Islands.

The inspector at Hilo, Bro. M. Newell, reports nine vessels boarded during the month, two carrying vegetable matter consisting of 96 lots and 1738 packages, which he reports as being in remarkably clean condition. Bro. Newell visited Puna district and found the Thimble berry very abundant, only showing here and there a few diseased plants. Owing to the rainy weather he has not been able to go to Glenwood, but will do so about October 1st, when he will collect soil and plants and forward them to me. Nothing further can be reported regarding the killing off of this berry, as we have as yet not been able to determine the disease.

A communication, which the President of the Board received from Mr. F. J. Lowrey, reporting about koa trees on the left-hand side of Nuuanu Valley above his place being in a dying condition, was referred to me, requesting me to look into the matter.

I beg to report that I visited the locality in company with Mr. Ralph S. Hosmer, Superintendent of Forestry, and Mr. David Haughs and I found that the trees are not dying, but their unhealthy appearance is due only to defoliation caused by the common koa caterpillar, *Scotorphythera idoli*. The trees are already putting out new growth and will soon have their healthy appearance again. We also visited the planted groves at Mr. Lowrey's place, but did not find any indication of the caterpillar work; in fact, the defoliated area seemed very local, and is a case of an extraordinary outbreak under favorable climatic conditions. I shall keep a watch on the infested area to ascertain whether or not a second brood will follow the first.

Attached hereto I submit a report of the work of Assistant Entomologist, Mr. H. O. Marsh.

Very truly yours,

EDWARD M. EHRHORN,
Superintendent of Entomology.

ASSISTANT ENTOMOLOGIST'S REPORT.

Honolulu, Hawaii, Oct. 1, 1910.

Mr. E. M. Ehrhorn, Superintendent of Entomology, Honolulu, T. H.

Sir:—During the month of September I have continued my

entomological investigations along practically the same lines as indicated in my report for August.

Fully two-thirds of the time I have spent in the field making experiments and observations and taking notes on the various insect pests of vegetable crops and ornamental plants. I have also devoted some of the time spent in the field to demonstration work and in this way have taught some of the growers the proper methods of preparing and applying insecticides.

The time not spent in the field has been devoted to breeding insects, writing notes, letters, and the manuscript of reports and articles for publication. I have worked on an article concerning my experiments and observations on *Macrosiphum sanborni*, at odd moments, when more pressing work did not claim my attention and now have the manuscript nearly completed.

I have paid particular attention to making careful, accurate notes on my experiments and field and insectary observations. These notes, which accumulate rapidly, I have carefully written and filed and they form a permanent and valuable addition to the office records.

The experiments on the melon fly (*Dacus cucurbitae*) and the Japanese beetle (*Adoretus tenuimaculatus*) have been continued and some gratifying results obtained. Additional experiments have also been made on several species of plant lice, mealy bugs and on three cabbage and beet pests.

The nicotine preparation known as "Black Leaf 40" has continued to give excellent results on plant lice and mealy bugs when used in combination with whale-oil soap and properly applied by spraying. After many experiments, I have determined the most satisfactory combination to be "Black Leaf 40" $1\frac{1}{4}$ fluid ounces and whale-oil soap 4 ounces in 5 gallons of water. The soap aids the spray in adhering to the bodies of the insects and, judging from my experiments, soap or some other adherent is necessary if good results are to be obtained. If this solution is thoroughly applied to the infested plants as a fine, forceful spray it can be relied upon to kill every plant louse that is wet by it. Many species of mealy bugs can also be readily killed in this manner, but such a species as *Pseudococcus filamentosus*, which is covered with a thick, cottony secretion, is more difficult to kill.

One particularly good feature of this solution is its almost immediate killing effect on insects sprayed with it. I have obtained successful results from applications which were followed within a half hour by heavy rains. An insecticide which will give good results under such circumstances is especially valuable in a climate such as we have in many parts of the Islands, where frequent rains would wash off the spray and thus prevent satisfactory results if a more slowly acting material were used. Another point in favor of this solution is that it is not injurious to any but

extremely delicate plants and therefore can be used without danger by unskilled labor.

At the present time "Black Leaf 40" cannot be purchased locally but, at my request, Messrs. E. O. Hall & Son have ordered a supply and within a few weeks it will be on sale in Honolulu.

I have been surprised by the reports of serious damage done to cabbage, during the winter months, by the "cabbage worm" (*Pontia rapae*). On the mainland I have never experienced any difficulty to control this species by spraying with arsenicals.

Spraying with Paris green was reported as ineffective by one local grower and to test the efficiency of this poison, when properly applied, under local conditions, I sprayed a patch of cabbage which was infested by the larvae of this species and obtained absolutely successful results. The mixture used in this experiment was at the rate of two pounds of Paris green and eight pounds of whale-oil soap in 100 gallons of water. The application was made at 5 p. m. and at 10 a. m. the following day every "worm" on the sprayed plants was dead. Judging from the uniformly successful results I have obtained, both locally and on the mainland, I am convinced that the failure reported by the local grower was due to the lack of a thorough application.

When spraying for this "worm" either arsenate of lead or Paris green may be used, but personally I prefer the latter because of its quicker killing effects. Cabbage leaves are very smooth and it is necessary to add some sticky material to the mixture, otherwise the spray will collect in large drops and much of it will roll off of the plants. Whale-oil soap has proved very successful as a "sticker" and when it is added to the mixture an exceedingly light, even coat of the poison can be applied to the plants. Refuse molasses may be used in place of the soap, but the poison will then be much more readily washed from the plants by rains than if soap were used. The mixture should be applied to the plants from above and preferably from two sides, as a fine, forceful spray and an effort should be made to wet, as far as possible, every portion of the foliage. Thorough work should be insisted upon and if spraying is commenced early in the season, before the "worms" have had an opportunity to multiply greatly and do serious damage, there seems to be no reason why this pest cannot be as easily and as successfully controlled in these islands as it is on the mainland.

During the latter part of the month, at the request and with the coöperation of Mr. F. G. Krauss, I commenced a series of experiments on *Aphis maidis*, a plant louse, which is seriously infesting an acre plot of broom corn grown on the U. S. Experiment Station grounds. Owing to their low value it is not ordinarily considered practicable to spray cereal crops for insect pests, but as broom corn promises to be, comparatively, a very valuable crop, it was thought desirable to undertake these experiments.

As yet the experiments have not been carried far enough to indicate final results although considerable interesting and valuable data has been obtained.

Respectfully,

H. O. MARSH,
Assistant Entomologist.

Minutes of the meeting of the Board of Commissioners of Agriculture and Forestry, held in the Board room, at the Capitol, on Wednesday, October 5, 1910, at 2 o'clock p. m.

Present:—Marston Campbell, President and Executive Officer; Messrs. H. M. von Holt and Albert Waterhouse, members; Edward M. Ehrhorn, Superintendent of Entomology, and Dr. V. A. Nörgaard, Territorial Veterinarian.

Routine Reports.

The regular monthly report of the Superintendent of Forestry, of the Superintendent of Entomology and that of the Superintendent of Animal Industry was read by title, accepted, and copy of each given to press for local notice.

Forestry—Dying Koa Trees.

On September 21, Mr. F. J. Lowrey addressed a communication to the Board in regard to the many koa trees in Nuuanu Valley apparently dying, losing their leaves and the wood infested with borers.

The President called this matter to the attention of the Entomologist and he and the Superintendent of Forestry proceeded to inspect them. As a result of this investigation Mr. Ehrhorn had to report to the Board that the unhealthy appearance of these trees is due to defoliation caused by the common koa caterpillar, that as soon as the new leaves come they will appear healthy again and that for a time he will keep a close watch over the infested area.

Mr. von Holt said that in connection with the koa trees, he had noted an unusually large crop of the seed this year up on Tantalus, and as there is ordinarily a scarcity of this seed he suggested that the Superintendent of Forestry be notified to send his men up there to gather the same.

The President stated that the koa tree is one especially suited to our climatic conditions and the Secretary was instructed to write Mr. Hosmer asking him to have his men gather all the seed they could find.

Finances.

On account of the recent depressing financial circumstances of

the Board, the Secretary was instructed to hold up bill of \$650 for Quarantine Station rent, from July 1, 1910, to June 30, 1911, until November of this year.

A statement of the present financial condition was submitted and approved.

President Campbell read letter of September 28, to Attorney General Alexander Lindsay in regard to the many applications the Superintendent of Forestry receives to grow trees, and inquiring if the moneys derived from the sale of these trees can be used in defraying the cost of labor in planting and caring for the trees, as the Board's income is insufficient to meet all demands; also the Attorney General's reply was read, dated September 30, stating that all such money received by the Department for the sale of plants must be turned into the general treasury as a government realization, and referring the Board to Section 385, of the Revised Laws of 1905, as follows:

"Sec. 385. *Income from Forest Reserves.* In case any moneys shall accrue from any forest reserve, or the products thereof, the same shall be deposited in the treasury as a special fund for the preservation, extension and utilization of forests and forest reserves, and the same shall be there held available for use under this chapter, subject to withdrawal and use in the same manner as moneys appropriated by the legislature."

Animal Industry.

At the last meeting a communication to Dr. A. D. Melvin was transmitted by the Territorial Veterinarian, for the Board's approval and the President's signature, then to be forwarded to the Governor for his approval, which letter requested additional Federal assistance in the matter of eradicating tuberculosis and other communicable diseases among the dairy herds in this Territory. Mr. Campbell read a copy of Governor Frear's letter dated September 20, to Dr. Melvin, the Chief of the Bureau of Animal Industry at Washington, D. C., expressing his approval of the action of the Territorial Board and stating that he hoped Washington would see its way clear to render the Territory some assistance.

President Campbell also read letter of September 6, by the Committee on Health and Sanitation—composed of Messrs. R. W. Aylett, Wm. H. McClellan and Daniel Logan—to the Honorable Mayor and Board of Supervisors, stating that the Board of Supervisors had no funds for further aid to the dairy cattle inspection.

Mr. Campbell stated that he had informed the Board of Supervisors that if they cannot see their responsibility in this matter, the Board of Agriculture and Forestry does and this Board will continue the work along the same line at its own expense.

On September 14, a letter was addressed to the Matson Navi-

gation Company calling attention to three animals in a shipment from Seattle which arrived here unaccompanied by the required certificates of mallein test, which is a violation of the rules and regulations of this Board. Mr. Campbell read letter in response to this, dated September 19, setting forth that that company will be very careful that all future shipments of live stock received in the Hawaiian Islands by vessels of their line will be accompanied by these certificates. The Secretary of the Board was instructed to acknowledge the receipt of this letter and to thank the agents of the Matson Navigation Company for the assurance that our instructions will be strictly carried out hereafter.

Mediterranean Fruit Fly.

The Board then went into executive session. Mr. E. M. Ehrhorn, Entomologist, of the Board of Agriculture and Forestry, appeared before the Board and stated that with much regret he had to report the appearance of a new pest on the Island of Oahu, named the Mediterranean Fruit Fly (*Ceratatis capitata*) and from the general distribution he thought, with other authorities, that the pest must have been in the islands at least two years, if not longer. Mr. Ehrhorn realizing the enormous danger of this pest, not alone to the agricultural industries of the Hawaiian Islands, but to California, he thought it but just for the Board of Agriculture and Forestry to officially notify the State Commission of Horticulture of California of the appearance of this dreaded pest so that they may be on the lookout and prevent the introduction of it into their State.

The Board acquiesced in this matter and on motion of Mr. Waterhouse, seconded by Mr. von Holt, the Entomologist was instructed to officially communicate with the State Commissioner of Horticulture in regard to this matter, but before doing this his letter should be submitted to the Board for perusal.

Division of Entomology.

REPORT OF SUPERINTENDENT OF ENTOMOLOGY.

Honolulu, October 26, 1910.

Honorable Board of Commissioners of Agriculture and Forestry,
Honolulu, T. H.

Gentlemen:—Since my report to you on the finding of the Mediterranean fruit fly (*Ceratatis capitata*), in Honolulu and vicinity and receiving your instructions regarding the sending of an official notice of the appearance of this pest to the State Commission of Horticulture of California, I beg to say that due notice

has been sent to that Commission, and a copy of my letter is submitted herewith. I have endeavored to trace the spread of the fruit fly as far as possible and to learn something from those who claim to have known of its existence here last season.

The Mediterranean fruit fly (*Ceratitis capitata*) is reported from the countries bordering the Mediterranean Sea, Cape Colony, Natal, Azores, Australia, New Zealand, Brazil and Bermuda. It is reported as attacking oranges, lemons, limes, guavas, mangoes, peaches, sapote, loquat, eugenias and other soft-meatd fruits. As far as I have been able to study this pest here I have only been able to rear the fly from oranges and limes.

From the report of various growers and from the present distribution of the pest we have come to the conclusion that the pest was introduced several years ago. Judge Cooper, of Manoa, reports that about three years ago he submitted affected oranges to the U. S. Experiment Station and the Board of Agriculture and that at that time the blemish on the fruit was considered only a bruise. This is not impossible, for when the fruit is first attacked and the larvae have not broken through the skin so that juices issue, the affected part has a close resemblance to a bruise. Only on cutting open the affected portion and finding maggots, would any suspicion be aroused. Very often after the maggots have escaped, especially is this true of a very dry orange, the remaining dark spot resembles a bruise. Judge Cooper's observation of the condition of the fruit at that time tallies with his observations today and we find the maggot present in great numbers. A party from Kalihi reports finding oranges with bruises (maggots) in August of last year and brought me specimens from the locality in the beginning of September of this year from which I reared the fruit fly.

April 2nd of this year Mr. Blackman of Kaimuki, brought in a few oranges which contained maggots of different size. These I placed in a breeding jar and on April 7th I visited Mr. Blackman's place to further study the trouble. I procured more specimens and observed the melon fly resting in the trees. From the material collected we reared mostly *Drosophillids*, which feed on fermenting juices, but we also reared one adult melon fly. Nothing further was thought of this matter because we found that many of the oranges on the trees showed thorn injury and we came to the conclusion that this had attracted the *Drosophillids* and the melon fly.

On June 21st Mr. D. T. Fullaway of the U. S. Experiment Station brought an adult of the Mediterranean fruit fly into my office and reported finding it in his insectary, which is all screened with fine mesh wire. He could not account for the appearance of the fly and to his knowledge no materials of any kind had been brought in from outside countries. On account of this I again visited Mr. Blackman's place, the only place where oranges had been found infested with maggots, but failed to find any

trace of further damage to his fruit. It was not until September of this year that it was definitely determined that the fruit fly was here when Mr. Terry and Dr. Perkins of the Hawaiian Sugar Planters' Association Experiment Station found some adult flies on the window of the laboratory. Mr. Terry made a diligent search in several localities and found some oranges and limes on the slope of Punchbowl which were punctured and contained maggots. I also continued my investigations and found infested oranges in the vicinity of Makiki fire house, Kewalo, Kinau and Keeaumoku streets. From all this material we succeeded in raising the adult Mediterranean fruit fly with many *Drosophillids* and a few *Notogrammas*, these latter only drawn to the fruit on account of fermentation and decay.

On September 20th I reported the finding of the adult flies to Hon. Marston Campbell and suggested the advisability of keeping matters from the public until we had actually succeeded in rearing the adult flies from the infested oranges in our breeding cages. At the last meeting of the Board I was able to report definitely that we had reared the flies and recommended that we notify the California State Commission of Horticulture officially before this matter appeared through the newspapers. This has been done and I expect to receive an answer from California by the next mail.

From my observations I may state that the Mandarin orange, lime and common seedling orange appear to be attacked quite severely whereas the Navel orange is only slightly attacked. I have also failed to find any other fruits attacked by the pest and further observations will be necessary to determine what damage this fly will do to our island fruits. There seems to be quite a discrepancy in the record of the food of this pest as reported by writers in various countries and we shall no doubt be able to find out many new phases from our investigations.

Now that this pest has established itself on Oahu I would recommend that the Board pass a regulation, if this can be done, to prohibit the shipping of Oahu grown fruit to the other islands and I have made a rough draft of such a regulation which I herewith submit for your kind consideration. Further reports will be made from time to time as new observations are made.

Respectfully submitted,

EDW. M. EHRHORN.

Superintendent of Entomology.

Division of Forestry.

REPORT OF SUPERINTENDENT OF FORESTRY.

Honolulu, October 26, 1910.

Board of Commissioners of Agriculture and Forestry, Honolulu, Hawaii.

Gentlemen:—I have the honor to submit herewith the report of the Division of Forestry for the month of October, 1910. During this month, in addition to the routine work, the activities of the division have been about equally divided between preparations for Arbor Day and matters in connection with the creation of proposed forest reserves.

From October 4 to 19, I, personally, was away from Honolulu on the Island of Hawaii, looking into a number of matters of forest interest. These included a visit to the Kapapala Ranch in Kau, to inspect at the request of Mr. Julian Monsarrat, the manager of the ranch and the local District Forester, a growth of young Ohia Lehua trees that is coming up vigorously in certain of the paddocks. It is difficult to assign a reason why this particular forest should suddenly have started to grow and spread, but the fact remains and from a forest standpoint is most satisfactory. To get at the reason why this growth has started is a forest problem worthy of careful investigation. It is one that ought to and will be given attention.

In the Puna district I visited the lumbering operations of the Hawaiian Development Company above Pahoā, and of Messrs. Cant and Bolte at Kaueleau, and saw the rubber trees in the Pacific Development Company's tract.

About Hilo I spent some little time in getting into touch with forest conditions on the Government land of Waiākea, with the object of obtaining data on which to base recommendations to be made later, of definite boundaries above which the heavy forest on this land should be set apart as a forest reserve.

The most important reason for my going to Hilo at this time was, however, to visit the Hilo sub-nursery that is carried on by this division under the supervision of Brother Matthias Newell. For a long time Brother Matthias has made tree growing his avocation. Now, since the Government has been able to cooperate by furnishing a regular laborer and a definite monthly stipend for expenses, it has been possible to develop the nursery and make it fill a larger place in the life of the Island of Hawaii. From the Hilo nursery it is possible to supply trees to persons from the Volcano House to Laupāhoehoe. Just now, anticipating the needs of Arbor Day, Brother Matthias has ready for distribution about 20,000 trees of a variety of species, useful and ornamental. Thanks to the generous coöperation of the Hilo

Railroad and of the Volcano Stables Company boxes containing trees for Arbor Day planting are carried free. The newspapers in Hilo have given good publicity to the fact that trees are to be had, so that there is no good reason why any one in the Puna or Hilo districts who wants to plant trees should go without.

I cannot pass from this subject without bearing special testimony to the disinterested and generous manner in which Brother Matthias has given his time, energy and best thought to the interests for which this department stands. Both in forestry and entomology the Board is able through Brother Matthias to carry on work that it could not otherwise do, save at greatly increased expense. The people of Hawaii are fortunate in that this Board is able to count on the assistance of so able a collaborator as Brother Matthias, for the work that he is doing aids as truly as do more spectacular achievements to "help Hilo grow."

ARBOR DAY.

Preparations for the free distribution of trees on Arbor Day go on apace. At the Government Nursery at Honolulu, as has been said in earlier reports, something over 40,000 little trees are ready to be given out. In the sub-nurseries there are 20,000 at Hilo, and as many more at Homestead, Kauai—where Mr. Walter D. McBryde is rivalling Brother Matthias in his interest and activity in tree growing. Trees are also being made ready for local distribution at temporary sub-stations at Wailuku, Makawao and Hana, Maui; at Kohala and Honokaa, Hawaii, and at three or four less important points on other islands. General notice has been given in newspapers and by posters and hand bills in several languages so that no one who really wants trees and is willing to meet the Board half way has reason to feel that he has not been given an opportunity to get them.

BOTANICAL EXPLORATIONS.

Mr. J. F. Rock, the botanist of this Department, is now having a very satisfactory collecting trip on the upper slopes and in the crater of Haleakala. He writes that he is getting many interesting plants that will greatly increase the value of the herbarium. Eventually when these plants, with the others that have been collected during the past year, come to be worked up, there should be a very considerable addition to our knowledge of the local flora.

EXPERIMENTAL TREE PLANTING.

Additional Grant of Federal Funds.

I am glad to report that the Forest Service of the United States Department of Agriculture has again made an allotment for continuing the experimental tree planting work, auspiciously begun

last year on the higher slopes of Mauna Kea and Haleakala. This grant is for the present fiscal period, in the sum of \$1,000. Beside taking care of the temperate zone trees already started and adding others to those now in the ground, it is proposed to establish at several points in the Territory small groves of a number of kinds of Eucalyptus, new to Hawaii, that give promise of being valuable timber trees. Individuals and corporations naturally hesitate to plant untried species. Experimental planting is essentially work that the government should do. One such plantation has already been begun in Nuuanu Valley; others will follow.

CONSERVATION MEETING.

Definite arrangements have been made with the Directors of the Hawaiian Sugar Planters' Association for a public meeting to be held under the joint auspices of the Association and of this Board, in the Throne Room, on the afternoon of Wednesday, November 16, during the annual meeting of the H. S. P. A. At this meeting a number of short speeches will be made outlining the cardinal points of Conservation as they affect our local conditions. The meeting will then be open to general discussion. It is believed that the consideration of these matters, especially of the right use of water, is particularly pertinent at this time. Within a few days definite announcements in regard to the program and speakers will be made public.

USE OF THE BOARD BUILDING.

Following the usual custom I would note that the Library room of the Board was used on the evening of October 14 for a meeting of the Hawaiian Poultry Association.

Very respectfully,

RALPH S. HOSMER,
Superintendent of Forestry.

An article on shield-budding the mango, reprinted from the Rural New Yorker in this number, may have some useful advice for local growers of that fruit. It is interesting to note that the article mentions a bulletin of Mr. Higgins, horticulturist of the

A recent farmer's bulletin of the department of Agriculture, Washington, D. C., is entitled "Feeding Hogs in the South." It speaks highly of peanuts among other articles of hog feed recommended. Also it urges the pasturing of hogs on various grounds. The bulletin will probably be valuable to hog raisers anywhere.

PROCLAMATION.

ARBOR AND CONSERVATION DAY.

The practice, now widespread on the mainland, of setting aside one day each year as Arbor Day began in Hawaii five years ago. Since then, here as well as elsewhere, the larger movement for the conservation and development of all natural resources, of which Arbor Day represents only one phase, has made great progress. Last year, in consequence of the quickening of public conscience and interest and the practical results in the inauguration and extension of active work along these lines in this Territory, it was deemed fitting that the scope of the day be enlarged. This year these reasons hold with even greater force.

Accordingly, I hereby designate Friday, the 11th day of November, 1910, as ARBOR AND CONSERVATION DAY for the Territory of Hawaii, and recommend that on that day appropriate exercises be held in all the schools of the Territory and that a part of the day be devoted to the planting of trees and shrubs.

Given under my hand and the Great Seal of the Territory of Hawaii at the Capitol in Honolulu, this 28th day of October, A. D. 1910.

[Seal]

W. F. FREAR,
Governor of Hawaii.

By the Governor:

E. A. MOTT-SMITH,
Secretary of Hawaii.

Office: Brewer Building, Queen St.
Works Iwilei,

Telephone 430.
Telephone 272.

The Hawaiian Fertilizer Co., Ltd.

HONOLULU, HAWAII.

MANUFACTURE AND DEAL IN ALL KINDS OF
Fertilizer and Fertilizer Ingredients
INCLUDING :

Bone Meal,	Sulfate Ammonia,
Nitrate Soda,	Sulfate Potash,
Double-Superphosphate,	Dissolved Guano,
Ground Limestone, etc., etc.	

BOARD OF DIRECTORS :

Chas. M. Cooke, President,	E. F. Bishop, Treasurer,
E. D. Tenney, Vice-President,	J. Waterhouse, Secretary,
Geo. H. Robertson, Auditor,	
W. M. Alexander	
C. H. Atherton,	
E. F. Bishop, Managing Director,	
Norman Watins, General Superintendent	

The products of this company are equal in every respect to any fertilizers sold in any market. In none of the conditions are they ranked by those manufactured elsewhere.

We will be pleased to furnish analysis of the soil of any locality in the Territory and make special fertilizers for different soil products arranging the composition to suit conditions.

Prices and Terms on Application.



Anyone sending a sketch and description may quickly ascertain our opinion free whether an invention is probably patentable. Communications strictly confidential. HANDBOOK on Patents sent free. Oldest agency for securing patents. Patents taken through Munn & Co. receive special notice, without charge, in the

Scientific American.

A handsomely illustrated weekly. Largest circulation of any scientific journal. Terms, \$3 a year; four months, \$1. Sold by all newsdealers.

MUNN & Co. 361 Broadway, New York
Branch Office, 625 F St., Washington, D. C.

Garden and Farm Tools and Implements

To do good farming you must have up to date tools to work with. We carry a most complete line of everything needed by the small or large farmer, from the smallest hand trowel to the largest cane plow. We also have a good assortment of Hand, Bucket or Barrel Sprayers. Our assortment of Hoes, Shovels, Spades, Mattocks, Rakes, Garden Shears, Lawn Mowers, Garden Hose, and other things that are needed daily about the farm or garden, is most complete and our stock large.

E. O. HALL & SON, LTD.

Board of Agriculture and Forestry.

PUBLICATIONS FOR DISTRIBUTION.

Any one or all of the publications listed below (except those marked *) will be sent to residents of this Territory, free, upon application to Mailing Clerk, P. O. Box 207, Honolulu.

BOARD.

- Report of the Commissioner of Agriculture and Forestry for 1900; 66 pp.
Report of the Commissioner of Agriculture and Forestry for 1902; 88 pp.
* First Report of the Board of Commissioners of Agriculture and Forestry, from July 1, 1903, to December 31, 1904; 170 pp.
Second Report of the Board of Commissioners of Agriculture and Forestry, for the year ending December 31, 1905; 240 pp.; 8 plates; 10 text figures.
Third Report of the Board of Commissioners of Agriculture and Forestry, for the year ending December 31, 1906; 212 pp.; 3 plates; 4 maps; 7 text figures.
Fourth Report of the Board of Commissioners of Agriculture and Forestry, for the calendar year ending December 31, 1907; 202 pp.; 7 plates.
Fifth Report of the Board of Commissioners of Agriculture and Forestry, for the calendar year ending December 31, 1908; 218 pp.; 34 plates.
"Notice to Importers," by H. E. Cooper; 4 pp.; 1903.
"Digest of the Statutes Relating to Importation, Soils, Plants, Fruits, Vegetables, etc., into the Territory of Hawaii." General Circular No. 1; 6 pp.
"Important Notice to Ship Owners, Fruit Importers and Others Rules and Regulations Prohibiting the Introduction of Certain Pests and Animals into the Territory of Hawaii." General Circular No. 2; 3 pp.; 1904.
"Law and Regulations, Importation and Inspection of Honey Bees and Honey." General Circular No. 3; 7 pp.; 1908.
"The Hawaiian Forester and Agriculturist," a monthly magazine. Vols. I to VI; 1904-1909. To be obtained from the Hawaiian Gazette Co., Honolulu. Price \$1 a year.

DIVISION ON ENTOMOLOGY.

- "The Leaf-Hopper of the Sugar Cane," by R. C. L. Perkins. Bulletin No. 1; 38 pp.; 1903.
** "A Catalogue of the Hemipterous Family Aleyrodidae," by G. W. Kirkaldy, and "Aleyrodidae of Hawaii and Fiji with Descriptions of New Species," by Jacob Kotinsky. Bulletin No. 2; 102 pp.; 1 plate; 1907.
* "On Some Diseases of Cane Specially Considered in Relation to the Leaf-Hopper Pest and to the Stripping of Cane," by R. C. L. Perkins. Press Bulletin No. 1; 4 pp.; 1904.
"A Circular of Information," by Jacob Kotinsky. Circular No. 1; 8 pp.; 1905.
"The Japanese Beetle Fungus," by Jacob Kotinsky and B. M. Newell. Circular No. 2; 4 pp., cut; 1905.
Report of the Division of Entomology, for the year ending December 31, 1905. Reprint from Second Report of the Board; 68 pp.; 3 plates; 10 text figures.
Report of the Division of Entomology, for the year ending December 31, 1906. Reprint from Third Report of the Board; 25 pp.; 7 text figures.
Report of the Division of Entomology, for the year ending December 31, 1907. Reprint from Fourth Report of the Board; 18 pp.; 1 plate.
Report of the Division of Entomology, for the year ending December 31, 1908. Reprint from Fifth Report of the Board; 26 pp.; 2 plates.

DIVISION OF FORESTRY.

- * "Forest and Ornamental Tree Seed for Sale at Government Nursery." Press Bulletin No. 1; 3 pp.; 1905.
* "Suggestions in regard to the Arbor Day Tree Planting Contest." Press Bulletin No. 2; 7 pp.; 1905.
"An Offer of Practical Assistance to Tree Planters." Circular No. 1; 6 pp.; 1905.
"Revised List of Forest and Ornamental Tree Seed for Sale at the Government Nursery." Press Bulletin No. 3; 4 pp.; 1906.
* "Instructions for Propagating and Planting Forest Trees." Press Bulletin No. 4; 4 pp.; 1906.
"Instructions for Planting Forest, Shade and Ornamental Trees." Press Bulletin No. 5; 7 pp.; 1909.
"Na Hoakaka no ke Kanu Ana i na Laau Malumalu ame na Laau Hoohiwhiwa." Press Bulletin No. 6; 8 pp.; 1909.
Report of the Division of Forestry, for the year ending December 31, 1905. Reprint from Second Report of the Board; 77 pp.; 5 plates.
* Report of the Division of Forestry, for the year ending December 31, 1906. Reprint from Third Report of the Board; 123 pp.; 4 maps.
Report of the Division of Forestry, for the year ending December 31, 1907. Reprint from Fourth Report of the Board; 70 pp.
Report of the Division of Forestry, for the year ending December 31, 1908. Reprint from Fifth Report of the Board; 85 pp.

** This Bulletin will be sent only to persons interested in the subject.

* Out of print.

Board of Agriculture and Forestry.

PUBLICATIONS FOR DISTRIBUTION—Continued.

DIVISION OF ANIMAL INDUSTRY.

- * "Inspection of Imported Live Stock." Rule 1; 1 p.; 1905.
- * "Inspection and Testing of Imported Live Stock for Glanders and Tuberculosis." Rule 2; 1 p.; 1905.
- "Concerning Glandered Horse Stock in the Territory." Rule 3; 1 p.; 1905.
- * "To Amend Rule 1, Inspection of Imported Live Stock." Rule 4; 1 p.; 1907.
- "Rules and Regulations, Inspection and Testing of Live Stock." Rules and Laws; 11 pp.; Revised; 1910.
- "Quarantine of Horse Stock from California." Rule 8; 1 p.; 1908.
- Report of the Division of Animal Industry, for the year ending December 31, 1905.
Reprint from Second Report of the Board; 62 pp.
- Report of the Division of Animal Industry, for the year ending December 31, 1906.
Reprint from Third Report of the Board; 41 pp.; 3 plates.
- Report of the Division of Animal Industry, for the year ending December 31, 1907.
Reprint from the Fourth Report of the Board; 104 pp.; 6 plates.
- Report of the Division of Animal Industry, for the year ending December 31, 1908.
Reprint from Fifth Report of the Board; 44 pp.

DIVISION OF FORESTRY.

FOREST AND ORNAMENTAL TREE SEED AND SEEDLINGS FOR SALE AT THE GOVERNMENT NURSERY.

The Division of Forestry keeps constantly on hand at the Government Nursery, seed and seedlings of the important native and introduced trees. These are sold at prices just covering the cost of collection or growing.

The list includes both forest and ornamental trees, such as Silk Oak, Koa, various species of Eucalyptus, Golden and Pink Showers, Pride of India, Poinciana, Albizzia, etc. The price of the seed varies from 10 to 50 cents per ounce. The seedlings may be had for 2½ cents each, except a few kinds which are 5 cents. Seed of the various palms is also for sale; the price per 100 varying from \$1.00 to \$2.50. All seed is tested before being sent out, which insures its being good.

All communications in regard to seed or trees should be addressed to David Haughs, Forest Nurseryman, Box 207, Honolulu, Hawaii.

RALPH S. HOSMER,
Superintendent of Forestry.

DIVISION OF ENTOMOLOGY.

To give information about insects free of charge is one of the duties of this Division and Hawaiian readers are hereby invited to make inquiry in person and by mail. In order to be able to advise intelligently or send the right kind of useful insects for relief we like and sometimes it is indispensable for us to see the insect suspected or caught in the act, also specimens of the injury. In a tin with a hole or two, or a wooden box specimens may be mailed at 3rd class rates. When specimens are not accompanied by letter *always* write your name and address in the upper left-hand corner of the package. Address all communications
**SUPERINTENDENT DIVISION OF ENTOMOLOGY, P. O. BOX 207,
HONOLULU, HAWAII.**

EDW. M. EHRHORN,
Superintendent.

VOL. VII.

DECEMBER, 1910

No. 12

Price, 10c. Per Copy; Per Annum, \$1.00; Foreign, \$1.25.

THE
Hawaiian Forester
AND
Agriculturist

A MONTHLY MAGAZINE

OF

Forestry, Entomology and Agriculture

ISSUED UNDER THE DIRECTION

OF THE

BOARD OF COMMISSIONERS OF AGRICULTURE
AND FORESTRY.

PUBLISHED MONTHLY.

Entered as second-class matter at the Post office, at Honolulu, Hawaïi.

ADDRESS ALL COMMUNICATIONS TO

DANIEL LOGAN,
EDITOR "THE FORESTER,"

P. O. BOX 366,
HONOLULU, H. T.

For business relating to advertising or subscriptions, address

HAWAIIAN GAZETTE Co., LTD., Publishers,
VON HOLT BLOCK, 65 S. KING ST., HONOLULU, HAWAII.

CONTENTS.

	PAGE.
Editorial	343
Damage Awarded Government for Destruction of Young Forest Growth	347
Qualifications of Foresters	347
Hog Cholera Serum	349
Shield-budding the Mango	351
The Mountain Trail from Wahiawa to Kahana.....	352
Conservation of Health	359
Board of Agriculture and Forestry	361
Division of Entomology	367

OFFICERS AND STAFF OF THE BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY.

COMMISSIONERS.

Marston Campbell, *President and Executive Officer.*
J. M. Dowsett P. R. Isenberg
H. M. von Holt Albert Waterhouse

DIVISION OF FORESTRY.

Ralph S. Hosmer, *Superintendent of Forestry and Chief Fire Warden.*
David Haughts, *Forest Nurseryman.*
Joseph F. Roel, *Botanical Assistant.*
Bro. Matthias Newell, *in charge of Sub-Nursery at Hilo, Hawaii.*
Walter D. McBryde, *in charge of Sub-Nursery at Homestead, Kauai.*
David Kapihe, *Forest Ranger for Tantalus.*

DIVISION OF ENTOMOLOGY.

Edward M. Ehrhorn, *Superintendent of Entomology and Chief Inspector.*
 Albert Koebele, *Consulting Entomologist.*
 H. O. Marsh, *Assistant Entomologist.*
 D. B. Kuhns, *Inspector.*
 Fred Muir, *Beneficial-Insect Collector.*
 Bro. M. Newell, *Fruit and Plant Inspector, Hilo, Hawaii.*
 Robert R. Elgin, }
 W. O. Aiken, } *Honorary Fruit* { *Mahukona, Hawaii.*
 W. D. McBryde, } *and Plant Inspector* { *Kahului, Maui.*
 Dr. W. B. Deas, } *at* { *Koloa, Kauai.*
 Wm. Robb, } { *Hana, Maui.*
 { *Lahaina, Maui.*

DIVISION OF ANIMAL INDUSTRY.

Victor A. Nörgaard, *Superintendent of Animal Industry and Territorial Veterinarian.*
L. N. Case, *Assistant Territorial Veterinarian.*
John Vanhuizen, *Live Stock Inspector.*
J. C. Fitzgerald, *Deputy Territorial Veterinarian for Maui.*
H. B. Elliot, *Deputy Territorial Veterinarian for Hawaii.*
A. R. Glaziyer, *Deputy Territorial Veterinarian for Kauai.*

SECRETARY TO THE BOARD.

Mrs. C. H. Brown

CLERK AND STENOGRAPHER.

Miss Melika Peterson

EDITOR OF THE "FORESTER."

Daniel Logan

LIBRARIAN.

Miss Ella K. Dayton

THE HAWAIIAN FORESTER AGRICULTURIST

VOL. VII

DECEMBER, 1910

No. 12

SPECIAL CONSERVATION MEETING.

On Wednesday afternoon, November 16, 1910, there was held in the Throne Room at the Capitol, Honolulu, a public meeting to consider the local application of the five cardinal points of Conservation—the right use of lands, waters, forests and minerals, and the safeguarding of public health.

The meeting was held under the joint auspices of the Territorial Board of Agriculture and Forestry and of the Hawaiian Sugar Planters' Association. It was so timed as to become a part of the program of the annual meeting of the H. S. P. A. In the audience were a majority of the sugar plantation managers and other members of that Association, but in addition there was also present a goodly company of persons representative of the best thought and influence in the Territory in other lines.

Short addresses were made by Governor Frear, Messrs. Marston Campbell, Ralph S. Hosmer, Dr. E. V. Wilcox, Hon. W. O. Smith, Dr. W. C. Hobdy, Prof. C. H. Hitchcock, and Mr. Alonzo Gartley on various phases of the Conservation problem in its local aspects. These addresses contain so much that is worthy of permanent record that it has been decided to print them practically in full in the Forester. Next month's issue will, therefore, be a special Conservation number, the publication of the addresses being delayed that the stenographic notes may be revised by the several speakers.

We are sure that many of those in attendance at the meeting will be glad to read again the statements presented. To those who were not there a careful reading of these addresses will give a clear idea of why Conservation is a vital problem in Hawaii.

ABOUT RICE.

Farmers' Bulletin 417 of the U. S. Department of Agriculture is devoted to "Rice Culture" and ought to form a useful companion to the exhaustive report of Mr. Krauss, of the Hawaii Experiment Station, on rice investigations, lately

published serially in this magazine. This federal brochure is by S. A. Knapp, special agent in charge of farmers' co-operative demonstration work, Bureau of Plant Industry. Some of his general remarks are of great interest to students of dietary, which should include everybody. The following is a collection of his observations in different places in the bulletin, but here run together:

"Rice forms the principal food of one-half the population of the earth. It is more widely and generally used as a food material than any other cereal. The luxuriant growth of leguminous plants (beans, peas, etc.) at all seasons in tropical climates provides the nitrogenous food elements necessary to supplement rice. A combination of rice and legumes is a much cheaper complete food ration than wheat and meat, and can be produced on a much smaller area.

"Fashion demands rice having a fine gloss. To supply this the rice is put through the polishing process, which removes some of the most nutritious portions of the rice grains. In the process of polishing nearly all the fats are removed. In 100 pounds of rice polish there are 7.2 pounds of fats. In 100 pounds of polished rice there is only 0.4 pound of fat. Upon the theory that the flavor is in the fats, it is easy to understand the lack of flavor in commercial rice and why travelers universally speak of the excellent quality of the rice they eat in oriental countries.

"Boiled rice, flaked rice, rice puddings, croquettes, cakes, and many other well-known dishes made from rice form a part of the diet of many, if not of the majority, of the well-to-do families in the rice-producing sections of the United States. Rice polish or flour, which is now sold at the mills at three-fourths of a cent to one cent a pound for cattle food, or exported to Germany, will, when appreciated, be in demand for human food. It contains 10.95 per cent. of protein, in comparison with 7.4 per cent. for the clean rice.

"If rice is to enter largely into the list of economic foods for the use of the masses, grades must be established based on the food values and not on the polish of the surface. It would be just as sensible to place a price on shoes according to the polish they will take."

SUGAR GROWING IN THE PHILIPPINES.

An interesting official document from the Philippines is entitled, "The Sugar Industry in the Island of Negros." It is by Mr. Herbert S. Walker, of the chemical laboratory at Iloilo, and makes a book of 145 pages, with ten heavy plates, bearing two fine engravings each, added.

Originally, as the preface by Dr. Paul C. Freer, editor of

the Philippine Journal of Science, states, the purpose was to make an extended and thorough study of the sugar cane produced in the Philippine Islands, the nature of the soils as disclosed by chemical and physical examination, the area planted and the area available for sugar production. Circumstances, however, dictated that the efforts should be concentrated on the Island of Negros, as it produces the greatest amount of sugar for any given area in the Philippine Islands.

With reference to two former large volumes on the Philippine sugar industry, being the reports of hearings on the subject at Washington, Mr. Walker says: "While undoubtedly many true and conservative statements are contained therein, they are so covered up by a mass of exaggerated conjectures and estimates made by over-eager friends and enemies of the Philippines as to be practically valueless as a source of information." A few facts and observations of Mr. Walker will be of some interest to Hawaiian readers.

The history of Negros as a sugar-producing country practically begins with the year 1849, in which year the island, by command of the Spanish Governor-General, was placed under the jurisdiction of the religious order of the Recoletos. The rapid development of the industry which at once ensued and continued during the next forty years is attributed to the enthusiastic and untiring efforts of this corporation, ably assisted by the then British vice-consul, Nicholas Loney. What the status of the industry was in 1908 may be gathered from the following data: Number of growers, 484; area of growers' land actually cultivated in sugar, 27,096 hectares; same adapted to sugar culture but not so planted, 38,545 hectares; area of other land not planted, 16,904 hectares; piculs of 63.25 kilograms of sugar, 1,161,446; metric tons, in nearest whole numbers, 73,462. The number of growers mentioned is divided between 450 in twenty-two municipalities of Negros Occidental and 34 in thirteen municipalities of Negros Oriental, the Occidental having 24,748 and the Oriental 2348 hectares cultivated in sugar.

The average yield per hectare throughout Negros is 42.9 piculs, or 2.71 metric tons. This average is low owing to a comparatively large number of small growers that do not properly care for their cane, and Mr. Walker states that on a well-managed plantation the yield per hectare under normal conditions of land actually planted in cane will rarely fall below 60 piculs (3.8 metric tons), and frequently comes near 70 piculs (4.4 metric tons). Later, in discussing the future of Negros, he says: "The probable limits of annual sugar production in Negros during the next fifteen years might be estimated at a venture to be about 220,000 metric tons under the present system of small individual mills and estates, and 500,000 metric tons with adequate capital, care-

ful cultivation and a complete change to modern methods of manufacture. Just which of these limits will be more nearly approached can not be foretold, since it depends almost entirely upon the extent to which new methods shall be substituted for old."

There are comparisons of Negros soils and canes with those of other countries, including Hawaii. Mention is made of the exaggeration of the Hawaiian sugar yield by many inexact persons, and a reason for this is given in the fact that the highest yields are near Honolulu—consequently the most observed by travelers—and on irrigated and intensively cultivated land.

The length of time during which the cane is allowed to remain in the ground in Negros varies from nine to fourteen months, and will probably average between eleven and twelve. (In Hawaii it is from eighteen to twenty-four months.) The cost of producing sugar in Negros and marketing it at Iloilo, including 10 per cent. interest on capital when borrowed, is placed at an average of 4.15 pesos per picul, or 65.61 pesos (about \$32.80) per metric ton.

That both cultivation and manufacture are far behind those in Hawaii is evident, animal power supplied by the carabao for both processes being largely employed. Yet one of the pictures at the end of the book shows a traction engine drawing two disc plows, which is certainly an indication of progress. Although Hawaii is now drawing labor from the Philippines, "complaint is universal" in Negros, Mr. Walker says, "over the difficulty of obtaining a sufficiency of labor." Labor is paid for at an average rate of 25 centavos, Philippine currency, per day, with rations furnished by the hacienda, and costing about 15 centavos extra per man each day. As each small planter has his own mill, an excessive number of laborers is required in the few months of the milling season. Hence the planter who can not afford to keep on his plantation for the entire year men needed only in the grinding season is forced at that season to arrange with labor contractors for extra men, and as an additional inducement to advance 10 to 25 pesos for each man desired. Breaches of faith by contractors are frequent and sometimes, out of twenty or thirty men reporting for work and receiving a month's wages in advance, half the number will have escaped within a week. Several planters have informed Mr. Walker that they annually lose more money in this way than through all other causes combined. Year by year, it is complained, as men find out that they can break contracts and go unpunished, the practice is becoming more prevalent.

This latest description of the Philippine sugar industry may be ordered from the business manager, Philippine Journal of Science, Manila, P. I., or the Macmillan Company, 64-66 Fifth avenue, New York. Its price is \$1.25.

DAMAGE AWARDED GOVERNMENT FOR DESTRUCTION OF YOUNG FOREST GROWTH.

In an action for fire trespass on the Black Hills National Forest brought by the United States against the Missouri River and Northwestern Railroad, the jury has awarded damages to the Government not only for the loss of merchantable timber, but also for the destruction of unmerchantable young growth.

This is regarded by Government officials as establishing a very important precedent. So far as is known at the U. S. Department of Agriculture, it is the first time that any court has recognized what foresters call the "expectation value" of young growth as furnishing a basis for the award of damages. The difficulty in the way of such an award in the past has been that there was no way to prove to the satisfaction of the courts the money value of the loss suffered.

The award in the South Dakota case followed the presentation of evidence as to the cost of work in reforestation which the Government is actually doing in the Black Hills. The amount claimed for the young growth burned was \$12 an acre, and the claim under this item was allowed in full by the jury. The total amount of damages claimed was \$3,728.85, of which \$2,634.45 was for merchantable timber destroyed or injured by the fire.

It is recognized by foresters that the cost of artificial reforestation will not always furnish a fair basis for estimating the damage to forest reproduction. Where new growth can be expected by natural sowing from seed-trees on the ground within a short time, artificial planting or sowing is an unnecessarily expensive method. To meet such cases what are known as "yield tables" are being prepared. By the use of these the loss can be shown in terms of the final crop and the time necessary to produce it.

Thus, if it is known that ten thousand feet of timber per acre can be cut once in seventy years, it is easy to calculate the value of the crop when it is ten years old by discounting from its value when mature. In European countries where forestry has been long practiced this method is regularly applied in selling, condemning, or estimating damages on forest property. It is also used abroad in insurance, which would be impracticable if there were not both an accepted basis for determining the loss suffered and a reasonably accurate knowledge of the hazard involved.

QUALIFICATIONS OF FORESTERS.

Washington, October 24.—Examinations opened this morning in fourteen far Western States, and in Florida, Michigan,

Minnesota and Alaska, to fill vacant positions as assistant forest rangers on the National Forests. The examinations were held at national forest headquarters in all States in which national forests are located, except in Arkansas and Oklahoma, and lasted two days.

The positions pay, at entrance, a salary of \$1100 per annum. Men who enter the national forest work as assistant rangers are eligible for promotion to positions as rangers, and later to the position of forest supervisor, if they are good enough. The latter position pays a salary of from \$1600 up, and calls both for all-round executive ability and for a certain amount of practical knowledge of forestry. Rangers work under the forest supervisors, often with a particular district in their charge, protecting the forests against fire and trespass, handling much of the minor business with forest users, estimating and scaling timber and enforcing regulations under which purchasers of timber are allowed to cut on the national forests, building trails, supervising the work of forest guards, and on occasion leading forces of temporary employes against forest fires too large to be handled by the regular national forest force.

The forest ranger must therefore first of all be an experienced woodsman. In the words of the little pamphlet which the Department of Agriculture sends to persons making inquiry, "Invalids seeking light outdoor employment need not apply." He must be sound-bodied, inured to hardship, able to ride, pack, and take care of himself and his horses in the woods and mountains, familiar with the region and local conditions where he seeks employment, and a resident of the State in which he will be appointed. Although the requirements are largely physical and practical, they include both a sufficient education to qualify the ranger to transact national forest business intelligently, and knowledge of land surveying, mining laws and customs, and the handling of range livestock. In the Southwest some knowledge of Spanish is often necessary.

To secure the right kind of men the examination is largely a test of practical capacity to do things. The candidate must give a demonstration of his horsemanship, ability to pack, knowledge of the use of the compass, and similar matters. Other parts of the test are written examinations. Because of the desirability of securing, in the new rangers, recruits who will prove capable of rising to the higher responsibilities laid upon forest supervisors, the tests of educational qualifications have been strengthened. Thus the Government is obtaining picked men for the rank and file of its little army of employes who administer and promote the proper use of its nearly two hundred million acres of national forests.

HOG CHOLERA SERUM.

A successful demonstration of the value of the new government serum for preventing hog cholera was lately concluded at South Omaha, Nebraska, by the Bureau of Animal Industry of the United States Department of Agriculture. The efficiency of the serum has been proved many times in the past, but in order that its value might be brought more strikingly before the people of Nebraska a demonstration was arranged for at the Union Stock Yards at South Omaha in coöperation with the Union Stock Yards Company of Omaha.

The stock yards company purchased thirty pigs, weighing from 40 to 60 pounds each, from a farm which had been free from hog cholera for several years. These pigs were brought to the stock yards, and on July 23, 1910, four of them were injected with blood from hogs sick of hog cholera. These inoculated pigs were placed in a pen by themselves, and within five days they had become sick, at which time eighteen of the remaining pigs were each given one dose of the serum, while the other eight pigs were not treated in any way. The eighteen serum-treated pigs and the eight untreated pigs were then placed in the same pen with the four pigs which had been made sick by inoculation.

The four pigs which were first given hog cholera all died, and the eight untreated pigs all contracted the disease from them. The eighteen pigs which were given serum, and which were confined in the same pen with the four original sick pigs and with the sick untreated pigs, remained perfectly well, and were finally turned over to the officials of the stock yards company upon the completion of the experiment, September 17, 1910.

The Department of Agriculture does not distribute this serum to farmers, but is endeavoring to bring the value of this method to the attention of the stock-raising interests in order that they may arrange to secure State funds for the manufacture and distribution of the serum. The government authorities consider that this new serum treatment, if properly applied, will result in the saving of millions of dollars.

That agricultural education in the public schools is receiving earnest attention from the United States government is evidenced by the recent issue of two farmers' bulletins for the use of teachers from the Department of Agriculture. Bulletin 408 is entitled, "School Exercises in Plant Production," and Bulletin 409, "School Lessons on Corn." Both are by Dick J. Crosby, specialist in agricultural education, office of

experiment stations, with the assistance of F. W. Howe in the corn bulletin. They are manuals for teachers and not textbook for pupils. At a glance it is judged that they are thoroughly practical. Both of the works should be of great value in such institutions as Lahainaluna, Hilo Boarding and Boys' Industrial Schools in this Territory, or, indeed, in any of our rural schools, especially as their subject-matter may be studied in connection with arithmetic, botany and other school subjects.

The Journal of the Association of German Engineers states that the development of the last ten years points to the fact that, in the near future, ammonia will chiefly be used as an artificial fertilizer. Statistics show that Germany consumes its entire yearly production of 322,700 tons at home. England produces 348,000 tons, while the United States, in spite of its extensive use of coke as fuel, produces only 9000 tons.

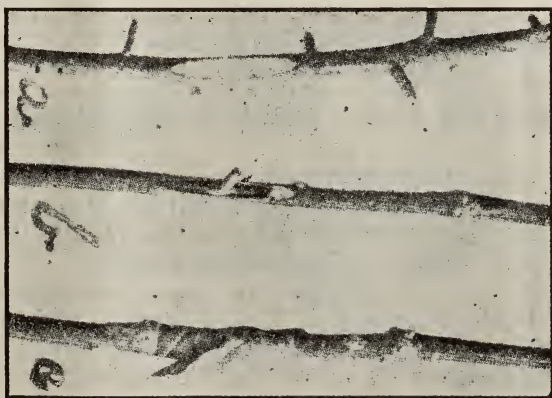
SHIELD-BUDDING THE MANGO.

(From the Rural New Yorker.)

Shield-budding of the mango has been with partial success practiced in Florida for at least six years by experimenters in the propagation of this fruit; the writer first experimented with this method with some success in 1904. The percentage of successful buds was, however, so low that he did not then feel justified in calling this method to the attention of the public, and the experimental work was temporarily suspended. However, experimentation has been continued by a few men interested in the problem, in some instances meeting with remarkable success. The success achieved by Mr. Orange Pound, Cocoanut Grove, Fla., deserves special mention, not only for the difficulties that he has successfully surmounted, but for the public-spirited way in which he has placed his data at the disposal of the writer for publication for the information of other mango-growers. It is not too much to say that Mr. Pound's discovery marks an epoch in the mango industry, not only in Florida, but in other parts of the world. Mr. Pound recently obtained, with this method, over 85 per cent. of healthy trees among a lot of 300 plants budded, a most gratifying result.

Success depends on the prime condition of the stock plant and that the sap is flowing freely; the buds should be selected from well-matured wood that is still green and smooth, of the first, second and third flushes from the terminal bud, and cut rather large, three to five centimeter long (one and a quarter to nearly two inches). The lower, thick part of the leaf stem at the bud

should not be trimmed off but allowed to remain on the bud until it is shed voluntarily. If the leaf-stem or petiole as it is also called, is cut too near the bud, fungi frequently gain entrance through the wound and destroy the bud. It is possible that the leaves can to advantage be trimmed off the bud-wood while it still remains on the tree, and the bud-wood be used after the petioles have dropped and the leaf scars are well healed. It appears to be equally satisfactory to push the buds up or downward. To facilitate the insertion of the bud, it is well to trim off the edge of the horizontal cut. In tying the bud, allow the remnant of the petiole to stick out between the strands of the tape and protect it and the bud from the sun and rain with a square piece of wax cloth held in place by one of the strands of the tape above the bud. It is essential that the buds should be inserted at a point in the stock where the bark is of about the same age as the bud-wood, i. e., green and smooth, and the work done when the plant is in flush. When the union has been effected, which will be in the course of two or three weeks, the stock should be pruned off about six inches above the bud. The buds are sometimes very dilatory about starting, and in order to force them out the plants should, after the buds have taken, frequently be gone over and all adventive buds rubbed off.



In top-working old seedling trees the same principle obtains. Part of the main branches are then pruned off to one to two feet from the trunk and the resulting sprouts are budded and treated in the manner already described. As the buds increase in size the native top is gradually removed; care should be taken, however, not to prune the tree too severely at one time, as it is then apt to become permanently injured and die from such treatment.

In, to some extent, employing another method called by the originator "slice-budding" matured bud-wood sufficiently old to have turned brownish or grayish, is also used in top-working seedling trees planted at stake. The back of the part of the stock

where the bud is inserted, or more correctly placed, should exhibit the same character. For all practical purposes this is identical with the chip-budding method employed in the propagation of pecans. The work is performed by cutting a slice or chip of bark and wood from the stock in the same manner as if the removed part was to be used as a bud; a shield bud just large enough to make a snug fit is now cut from the budstick and placed on the cut and tied in the usual way. In using either of the methods of budding described above, the stock should at the time of budding be girdled six to nine inches above the bud.

Mr. J. E. Higgins, horticulturist of the Hawaii Agricultural Experiment Station, Honolulu, Hawaii, in Bulletin 20 of that Station, describes a method of shield-budding the mango that has recently been tried with success there. An unusually large bud, 3 to 3½ inches long, is recommended, and that the buds be inserted on well-matured stock where the bark is rough and brownish, using bud-wood of the same character.

P. J. WEBSTER.

Washington, D. C.

THE MOUNTAIN TRAIL FROM WAHIAWA TO KAHANA.

VAUGHAN MACCAUGHEY, COLLEGE OF HAWAII.

Within the past few months there have been several expeditions over the ancient trail between Wahiawa and Kahana.

The trail was undoubtedly used in early times, but has evidently been untraveled for many years. Although not especially dangerous, it would tax considerably the pedestrian powers of any except well-hardened trampers.

The data used in this account was gathered from two trips—one in the company of J. S. Donaghho and D. Fraser, January 28-30, 1910; the other with A. M. Pardee, Company H., U. S. A., and A. H. Ford, July 31-August 2, 1910.

ROUTE.

The complete journey is divisible into ten distinct stages:

1. Honolulu to Wahiawa.
2. Wahiawa to Beginning of Ditch Trail.
3. Ditch Trail to Headgate Cabin.
4. Headgate Cabin to Ridge to Summit.
5. Up Ridge to Summit.
6. Summit to Ridge descending into Kahana.
7. Down Ridge to Kahana Stream.
8. Kahana Stream to Trail.

9. Trail to Kahana Beach.

10. Kahana to Honolulu.

To make the trip from the other direction—i. e., Kahana to Wahiawa, would be a hazardous venture, not to be attempted without careful planning, and an ample time allowance.

ITINERARY.

The time element is a very important factor in a trip of this kind. The schedule of my first trip was as follows:

Left Honolulu, 3:15 p. m.

Ar. Wahiawa, 6:30 p. m. (eating a cold supper on the train).

Left Wahiawa immediately, traveled the ditch trail by lantern light—a procedure which I should not advise others to attempt, there are many dangerous places along the trail—and arrived at Headgate Cabin at 10:30 p. m.

Left Headgate Cabin at 7 a. m.

Ar. Summit of Koolau Ridge, 12 M.

Ar. at deserted native house in Kahana Valley at 6:30 p. m., after over eleven hours of almost continuous tramping.

Spent the night here, leaving at 6 a. m., and arriving at Kahana R. R. station at 7:30 a. m.

Left Kahana on 12 M. train, arriving in Honolulu at 5:30 p. m., the entire trip thus being combated over two days.

The schedule of my second trip, with fifty heavily-laden soldiers, is as follows:

Left Honolulu, 10:20 a. m.

Ar. Wahiawa, 12 M.

Left Wahiawa, 12 M.

Ar. Headgate Cabin, 5 p. m.

Left Headgate Cabin, 5:45 a. m.

Ar. Summit Koolau Ridge, 12:30 p. m.

Along Summit Koolau Ridge until 6 p. m.

Leave Summit Koolau Ridge, 5 a. m.

Ar. Kahana Stream, 12:30 p. m.

Ar. Kahana Beach, 4 p. m.

The schedule which I should advise, and which is quite possible under present conditions, is this:

Leave Honolulu, 10:20 a. m.

Ar. Wahiawa, 12 M.

Leave Wahiawa 12:30 or 1 p. m.

Ar. Headgate, 5 p. m.

Leave Headgate, 5:30 a. m.

Ar. Summit Koolau Ridge, 11:30 a. m.

Ar. Kahana Stream, 5:30 p. m.

Ar. native house, 6:30 p. m.

Ar. Kahana Station, a. m.

Leave Kahana Station 12 M. train, arriving Honolulu 5:30 p. m.

EQUIPMENT.

The following equipment is essential, and its selection is based upon much experience:

Woolen shirt (2 pockets, with buttons).

Khaki trousers, army pattern is best.

Medium weight woolen underwear, full length. Cotton is very cold when wet, and should not be worn on such trips as this, where one may have to spend a night in rain and mud.

Heavy, hobnailed tramping boots. These must be durable and well-fitting. The hobnails should be either screwed in, or should be long enough to clinch firmly inside the sole. The short form commonly used is worthless.

Heavy woolen socks, 3 pairs.

Canvas leggings.

Canteen.

Blanket (single, all wool).

Heavy pocket-knife.

Candle (very useful for starting fire).

Leather gloves (to avoid lacerated hands).

Felt hat, campaign style.

My personal experience is that the best foodstuffs are sweet chocolate, dried raisins, fig bars, tea or coffee. Take enough for five light meals. Heavy eating is not conducive to good traveling.

EXPENSES.

Railroad fare—Honolulu to Wahiawa.....	\$.80
Railroad fare—Kahana to Honolulu.....	2.75
Food stuffs	1.00
Meals—Wahiawa and Kahana	1.00
Total	<hr/> \$5.55

THE TRIP.

I. *Wahiawa to Beginning of Ditch Trail.*

Follow the government road from the railroad station, across the bridge near the Consolidated Cannery, and mauka to the "Wood road." This is a private extension of the government road, and goes into the forest. Continue along this until you pass freshly-cut embankments. You will presently meet a trail beginning in a bend of the road, and ascending a grassy ridge. The trail is the Ditch Trail, and is marked Kapu. Ascend this trail and you will see to your left the beautiful verdant expanse of the Wahiawa Valley.

This first portion of the trip is through pineapple country. The roadsides are well bordered by trees, chiefly various species of fragrant eucalyptus.

The ends of the Wahiawaward ridges of the Koolaus to-

ward which you travel, appear at first as low foot hills, and not until one is really upon them does one realize their connection with the main mountain ridge.

II. *The Ditch Trail.*

In the following this trail mauka it is now necessary to be very careful, avoiding side trails made by surveyors, woodcutters, and cattle. These side trails usually have blind ends. The main trail is on the right side (south side) of the valley, and ends at the Headgate Cabin. There is much beautiful scenery along this trail, and this portion of the trip has been enjoyed by many people.

The Headgate Cabin is a substantial, one-room structure, near the stream. It has a large sleeping bunk, table, bench, stove, two windows, two doors.

The stove is in good condition, and hot coffee, dry underclothing, and a warm blanket make the hardness of the bunk endurable. The stream water is pure and cold, and there are several excellent pools suitable for a morning "dip."

This Ditch Trail was constructed some years ago, incident to the development of the Wahiawa water supply. It is, in general, in good condition, and traverses one of the most beautiful regions in the islands. Comparatively few people have gazed upon that sunny, stately grandeur of this valley. I have never heard of tourists taking this part of the trip, although the trail is easily accessible, and much of it can be covered on horseback.

From time to time the trail leads out over bold ridges, affording excellent observation points. A glint of sunshine through shining tropical foliage—the fragrance of full-fronded ferns—clear music of a wild bird rare—great stretches of forested ridge land—far away murmur of encanyoned stream—clumps of wild bananas, with smooth giant leaves, and half-ripened pendulous fruit clusters—maile odors, and smell of the cool, wet earth—with such subtle currency as this the Ditch Trail rewards the lover of the out-of-doors.

III. *Headgate Cabin to Ridge to Summit.*

Leaving the cabin as early in the morning as possible—as soon as there is light enough to see by is the wisest, for every minute is precious on this day's journey—you follow the trail along the stream, and in a few minutes have to wade in the stream. A short distance above the cabin is a large branch entering the main stream from the left. This is not to be confused with the main stream.

In general, wherever the stream makes a sharp turn, there is on one side a steep pali, and on the other a gravelly point. There are frequently trails across these points, and by fol-

lowing them, instead of going around the points, you can save considerable strength and time.

It is advisable to take only short rests, as a lengthy halt results in stiffness, and sometimes cramps, owing to the coldness of the water. In no case does one have to wade through water deeper than one's waist, although there are, in many places, pools ten to fifteen feet in depth. These, however, can easily be avoided.

After three hours of this rather wearisome travel, you reach a point at which the stream conspicuously forks, and the ridge between the two branches of this fork is the ridge to the summit. This ridge is conspicuously marked by means of a blazed tree near the stream, and easily visible from it. The blazing is three feet long. On this same tree various travelers have hung old articles of clothing—khaki coat, a white handkerchief, and a discarded cap.

At this point fill your canteen full of water. This is imperative, for there is no other sure water supply until you arrive at the stream in Kahana Valley.

Near the Headgate Cabin, on the opposite side of the stream, are clumps of one of the beautiful native hibiscus, "hauhele." (*Hibiscus Arnottianus*, Gray). This is a tall shrub or small tree, with large white flowers solitary in the axils of the uppermost leaves. The red staminal column is long and conspicuous. One occasionally finds the elongate capsules, which, being split open, are found to contain small, kidney-shaped seeds, each covered with brown wool. Hillebrand states that this species is found on all the larger islands, in forests between 1500 and 3000 feet above sea level. There is an excellent illustration of this beautiful blossom in Mrs. Sinclair's book of Hawaiian wild flowers.

There are four species of native hibiscus—the one just described, with white flowers, one with pink flowers, one yellow, and one red. The latter two are quite rare. Besides these there are many introduced species, some of which have escaped from cultivation.

Along the upper course of the stream, their roots washed by its cool waters, are several native palms. They are about thirty feet high, and contrast markedly with the stunted forms found on the summit ridge. This palm (*Pritchardia gaudichaudii*, H. Wendl.), called "loulu lelo" by the natives, has large fan-shaped leaves, which are covered beneath with a pale brown wool. The tree is found in small groves in various mountainous regions of the islands, and is common in cultivation. Excellent specimens are to be found in Thomas Square. Hillebrand states that this palm covers part of Bird Island, a small rock 400 miles NE. of Kauai. The seeds are small, oval, yellowish red in color, and while yet unripe are

sometimes eaten by the natives. In olden times the leaves were used for making fans and hats.

IV. *The Summit of the Koolaus.*

From the blazed tree heretofore mentioned a good trail leads up the ridge to the summit of the Koolau "backbone." This trail is good because fifty soldiers recently went over it, opening it. In several places it dips decidedly, but never off the main ridge.

On this, as on all ridges, one must be careful not to get down the side of the ridge, very far from the crest. Failure to exercise caution in this may cause serious delay, and possibly fatal accident.

Two hours of hard climbing bring you to the summit, from which you command a superb view of Kahana, Punaluu, the Kaneohe Bay region, Pearl Harbor, Wahiawa, Leilehua, Waialua, and the magnificent bold contours of the Waianae. The bird's-eye view of Kahana Valley is a feast to the eyes of the lover of scenery.

Lunch here, and with the least possible delay travel along the summit ridge to your right—eastward—Kaneoheward. It is now about noontide, and you will need every minute in order to reach the bottom before nightfall.

The ridge is uncleared for a short distance, and you may have some difficulty in pushing through the dense shrubbery that fringes the crest. There are many crumbling and dangerous places along this disintegrating summit, and constant caution is necessary. Do not, under any circumstances, be tempted to start down the Kahana side, as yet.

There was formerly a trail leading almost directly down from the summit ridge. In following this one did not travel along the summit. This trail is now impassable, due to recent landslides, and an attempt to follow it would bring one to the edge of blind palis. All the slopes end in blind palis, quite impassable.

After pushing along the summit for some little distance—this summit line is undulating, and you may have to climb and descend several little hills—you will arrive at a cleared space, where the soldiers camped. Continue straight along the summit, and you will find their trail, cut and beaten down by fifty men, and leading directly to the large ridge that you follow down into the valley.

V. *Into Kahana Valley.*

This large ridge, of which there is only one, and which you cannot easily miss, is the dividing ridge of the valley. When you arrive at it, and look eastward, you see the bare pali to your right, and the ridge descending abruptly below you.

Follow the beaten trail down this ridge, avoiding all blind

spurs. There are several rather steep drop-offs along the ridge, but they are all wooded, and can be descended without difficulty.

The trail finally passes through dense thickets of staghorn fern (wire fern) which may have somewhat overgrown it.

The ridge ends between the two branches of the Kahana Stream, near a forest of mountain apple trees.

It is by this time nearly dark, and you must pass rapidly down the stream, wading or following the shore, until you reach a deserted grass house on the edge of the stream, and visible for some distance. At this house you can spend a fairly comfortable night, and from there follow the good trail that leads on into Kahana village.

The descent from the cool and cloudy summit ridge of the Koolaus to the warm coral beach of Kahana is especially interesting to the botanist, because of the variety of plant zones through which one passes.

On the summit is a dense covering of scrubby vegetation—tough, woody, slow-growing, small-leaved, inconspicuous-flowered; exposed portions twisted and distorted by the eternal trade winds. The soil is never dry; by night, and commonly by day, the cool fogs enswathe the dripping peaks, and this cool humidity has produced manifold changes in the plants that cling to these precipitous pali tops.

Descending the ridge one encounters the familiar maile, festooning the path. Underfoot, and occasionally forming green embankments, is the "wawai iole," much used for Christmas decorations. The "ie ie" vine, cable like, and twisting into stout and entangling networks, often presents a formidable barrier to one unarmed with a cane-knife. It is only rivalled in exasperating qualities by the unmentionable wire fern. Whoever is wise will skirt the margins of its jungles, rather than brave its lacerating depths.

Kahana stream flows through forests of mountain apple trees, the individuals so close together that they are pole-like, and bare below, in striking contrast to the sprawling hau or wide-armed and robust kukui.

Here also are long grassy ridges, on whose lower slopes are groves of hala trees, with spiny leaves and prop roots.

In the moistest places are groves of wild bananas, clumps of gigantic-leaved api, and farther down, isolated taro patches.

For a considerable distance the trail passes through or along extensive hau jungles. Then swampy meadows, lush with rank grass, and finally the shining coral sands, upon whose fair expanse the foamy waves forever sing the drooning song of the sea.

CONSERVATION OF HEALTH.

Program Suggested for Use in the Public Schools on Arbor and Conservation Day by Hawaiian Branch of the Women's National Rivers and Harbors Congress—Suggestions for a Lecture to School Children on Tuberculosis.

PREPARED BY DR. W. C. HOBODY.

The following is only a sketch on which to elaborate a talk which should not consume over twenty minutes or a half hour. There should be much coming back to important points with repetition to drive home the fundamentals. The wording should be simple and all technical terms should be avoided:

1. Introduction. Consumption is a disease that affects the lungs with which we breathe.

2. Consumption makes many people sick and a great many of them die from it if they are not well taken care of.

3. Consumption is caught from other people who have the disease.

4. Consumption can be prevented by doing certain things and not doing other things.

5. Things to do:

a. Get lots of fresh air all the time. All the time means night as well as day. It is more important to have fresh air at night than at any other time. Learn to sleep with all the windows open and outside on the veranda, if possible. If one ever finds how nice it is to sleep out-doors, they will never want to sleep in the house again. The night air is not harmful, it is healthy. Nowadays lots of people sleep out-doors because it is so much nicer than to sleep in a room. If you do have to sleep in a room, have all the windows and doors open.

b. Keep your body clean. Every person should take a cold bath every day. You don't need a bathtub to do this. With a pail of water and a cloth you can have a refreshing bath all over. One should not only take an all-over bath every day, but one should always wash the hands before eating. It is easy to forget this, but it is a fact that the healthiest people are those who take care to have clean hands when they eat.

c. Sleep alone. We know that one person takes consumption from another person who already has the disease.

(When persons sleep together, it makes them apt to take any disease the other ones have.

6. Things not to do:

a. The greatest way for consumption to get to one is by the spit from a person who has the disease. So you must learn to do without spitting unless you can spit into something where it will be washed away or burned. If you all grow up with the habit of not spitting unless the spit is to be destroyed, it will stop the spread of consumption tremendously. Don't spit yourself, and tell others not to do so.

b. Don't put in your mouth anything that has come from the mouth of another person. This means apple cores, chewing gum, whistle, candy, etc.

c. Don't kiss a sick person. This is a foolish thing to do, and don't let people who are sick kiss you.

d. If you get thin or have night sweats, see a doctor. If you have a cough that lasts over ten days, see a doctor.

Alphabet for School Children in the Prevention of Tuberculosis.

A is for Anybody who can help prevent Consumption, a child just as well as a grown person.

B is for Breathing, which you should learn to do deeply. Take deep breaths in fresh air often.

C is for Coughing, which you should never do in anyone's face, nor should you sneeze in anyone's face.

D is for Don't. Don't swap apple cores, candy, chewing gum, half-eaten food, whistles, or anything you put in your mouth.

E is for Eating no fruit that has not been washed or peeled, or anything that is not clean.

F is for Fingers, which should not be put in the mouth nor wet to turn the pages of books.

G is for Giving good example to your fellow pupils and playmates by being always neat and clean, just as much so at home as at school.

I is for Illness of other kinds besides consumption, which following these rules will help prevent, such as colds, measles, grippe, diphtheria and pneumonia.

J is for Joints, where children have tuberculosis more often than in their lungs.

K is for Keeping your finger nails clean. A scratch from a finger nail may make a bad sore.

L is for Learning to love fresh air, and not learning to smoke.

M is for Mouth, which is meant to put food and drink into, and not for pins, or money, or anything not good to eat.

- N is for Nose, which you should never pick nor wipe on your sleeve.
- O is for Outdoors, where you should stay just as much as you can. Always play outdoors unless the weather is too stormy.
- P is for Pencils, which you should not wet in your mouth to make them write blacker.
- Q is for Question, which you should ask your teacher if you don't understand these rules.
- R is for Roughness in play by which you may hurt yourself or your comrades. If you cut yourself, have been hurt by others, or feel sick, don't fear to tell your teacher.
- S is for Spitting, which should never be done except in a spittoon, or a piece of paper, or a handkerchief used for that purpose alone. Never spit on a slate, on the floor, the playground, nor the sidewalk.
- T is for Teeth, which you should clean with toothbrush and water after each meal, or when you first get up in the morning and before you go to bed at night.
- U is for Unkind, which you should never be to a consumptive.
- V is for Vessels, like drinking cups and glasses, which should not be used by one child after another without being washed in clean water each time.
- W is for Washing your hands with soap and water before each meal, even if it is only lunch.
- X is for X-rays, which sometimes helps us discover consumption or other forms of tuberculosis.
- Y is for You, who should never kiss anybody on the mouth, nor allow them to do so to you.
- Z is for Zeal in carrying out these rules.

By DR. ADOLPHUS KNOPF,
New York Post-Graduate Medical School and Hospital.

BOARD OF AGRICULTURE AND FORESTRY.

Minutes of the meeting of the Board of Commissioners of Agriculture and Forestry, held in the Throne Room, at the Capitol, on Wednesday, October 26, 1910, at 2 o'clock p. m.

Present: Marston Campbell, President and Executive Officer; Messrs. H. M. von Holt and Albert Waterhouse, members; Edw. M. Ehrhorn, Superintendent of Entomology, and Ralph S. Hosmer, Superintendent of Forestry.

The minutes of the meeting of October 5 were read and approved, and on motion of Mr. Waterhouse, seconded by

Mr. von Holt, the paragraph attached—minutes of the executive session—was also approved and ordered spread in full on the records.

FORESTRY.

Mr. von Holt said that there was nothing before the Committee on Forestry on which to report.

In regard to the Division of Forestry supplying trees to individuals and corporations in very large quantities, the Board, after some discussion, voted that the Superintendent of Forestry be instructed to make the necessary arrangements for propagating sufficient trees and plants to meet all demands, the Board furnishing the supplies and possibly erecting another propagating house; it being understood, however, that the cost of the extra labor necessary for this work be borne by the individuals or corporations ordering the trees.

FOREST RESERVES.

Mr. Hosmer said that he was about to submit to the Committee on Forestry brief reports on four proposed forest reserves: South Kona, Hawaii; Hauula, Oahu, and additions to the Kau, Hawaii, and the West Maui reserves; the two last-named changes of boundary being made at the request of C. Brewer & Co.

REPORT ON THE EUCALYPTS.

President Campbell read a letter dated September 23, from the Associate District Forester at San Francisco, Mr. Coert Du Bois, in regard to the publication of Louis Margolin's report on Eucalyptus by the Board of Agriculture and Forestry in November, 1910, and stating that he hoped to have the copy, approved by the Secretary of Agriculture, in the hands of the Board by October 15.

ALLOTMENT FOR EXPERIMENTAL PLANTING.

Mr. Hosmer called attention to the fact that the Forest Service had recently made an additional grant of \$1000 for use during the fiscal year in continuing the experimental planting of trees on the high mountains of this Territory. It is intended to use a part of this money for starting groves of Eucalypts new to Hawaii, and other exotic trees at several places throughout the islands. One such plantation has already been begun in Nuuanu Valley.

EXPERIMENTAL TREE PLANTING.

Mr. von Holt asked how the trees already planted were getting along, to which Mr. Hosmer replied that he had recently received a report from Mr. Rock giving the results of

a careful examination of the plots on Haleakala, which showed that a very encouraging proportion of the seeds sown last March had germinated and were growing. Mr. Hosmer further said that when he was last on Mauna Kea, a few months since, he found that about forty per cent. of the transplants sent out were alive and growing. In work of this kind one must expect a good many failures, but the results so far are by no means discouraging. During this same trip a good many kinds of seed were sown which of course have not been heard from.

In this connection Mr. Campbell said that he should like to see California redwood given a more systematic trial than it has yet received in this Territory, it being one of the most valuable commercial trees. Mr. Hosmer replied that a number of small consignments had been made to various persons during the past year and that some trees from earlier shipments were already growing in a number of places, and added that redwood is unquestionably a tree that should be further experimented with.

KOA SEED.

President Campbell read reply of the Forest Nurseryman, dated October 12, to a letter addressed to the Superintendent of Forestry during his absence, in regard to collecting koa seed, in which he states that the seed boys have devoted considerable time to this work and that the Division of Forestry now has on hand several pounds of good koa seed.

KAHOOLAWE.

Mr. Campbell read a letter from Mr. Eben P. Low, dated October 12, in which Mr. Low agreed to remove his stock from the Island of Kahoolawe and do certain other things which the Board desired, including the killing off of the goats, in return for the privilege of having apiaries on the island for fifteen years. After some discussion, Mr. Low's letter was referred to the Superintendent of Forestry with the instruction that he work out a scheme and report back his recommendation to the Board at a later meeting.

CONSERVATION MEETING.

Mr. Campbell called the attention of the members of the Board to the fact that a special meeting to consider certain aspects of the Conservation problem in its local relations had been arranged for under the joint auspices of the Board of Agriculture and Forestry and the Hawaiian Sugar Planters' Association, to be held in the Throne room on the afternoon of Wednesday, November 16. A number of short papers are to be read with the object of provoking discussion that shall direct attention to certain things that need especially

to be done in the way of Conservation, particularly in a more systematic use of the local water resources.

On motion of Mr. Waterhouse it was voted that the Board approve the action of the President in calling this meeting.

Mr. Hosmer read the report of the Division of Forestry for October, 1910. It was voted that the same be accepted and copies given to the press for publication.

KOHALA FOREST RESERVE.

In reply to a question, Mr. Campbell announced that condemnation proceedings in the matter of acquiring the land of Kehena II, Kohala, Hawaii, had now been begun. The case will come up in the courts in the near future.

ENTOMOLOGY.

Mr. Ehrhorn read his report dated October 26, and stated that the Board's instructions had been carried out in the way of official notice sent to the State Commission of Horticulture, of which letter he submitted a copy, dated October 6, relative to the appearance of the Mediterranean fruit fly (*Ceratatis capitata*) in Honolulu and vicinity.

Mr. von Holt moved that the Entomologist's report be placed on file. Mr. Waterhouse seconded the motion, which was carried.

President Campbell requested the representatives of the press to see that this report is printed, not in extracts, but in full.

Mr. Ehrhorn exhibited dead specimens of the fruit fly and a colored plate illustration showing its life history; also larvae in alcohol.

During the month a number of oranges had been brought to the office for observation, and many of these were badly infested and found to contain maggots. On account of the thick skin the navel orange is not so rapidly attacked, Mr. Ehrhorn said, but of the native seedlings which have a very thin skin, at least, fifty per cent. have been injured.

RULE VII.

The Entomologist read Rule VII, drawn up for the approval of the members of the Board, a regulation to prevent the spreading of the Mediterranean fruit fly by prohibiting the carrying of soft-meated fruits grown on this island to any of the others.

The President stated that this rule passes the approval of the Board, subject to any corrections which may be made by the Attorney-General or the Governor, and when it is properly approved it will then be published. The Secretary of the Board was instructed to refer a copy of this regula-

tion to the Honorable Alexander Lindsay, Attorney-General, asking him to frame it up substantially as presented.

FINANCES.

Mr. Campbell stated that, under date of October 24, the Board of Apportionment held a meeting at which it was decided that the allowance to the Board of Agriculture and Forestry shall remain at \$3500 a month until further orders. He also stated that he had asked to have the unallotted balance of the Pupukea forest reserve planting and fencing fund (\$1200) transferred to the fund for publication and printing of bulletins and reports.

The regular financial statement, submitted by the Secretary to the Board, was approved and ordered placed on file.

ANIMAL INDUSTRY.

President Campbell read a letter to T. H. Petrie, secretary to the agents of the Matson Navigation Company, dated October 6, 1910, in response to communication from them dated September 19, in which they assure the Board of Agriculture and Forestry that all future shipments of livestock received for the Hawaiian Islands by vessels of their line will hereafter be accompanied by the required certificates in accordance with the Board's instructions.

DR. MELVIN'S LETTER.

President Campbell also read letter from A. D. Melvin, Chief of the Bureau of Animal Industry at Washington, D. C., dated October 4, 1910, in response to one from the Board dated September 14, referring to Dr. Norgaard's letter applying for Federal assistance, addressed to that Bureau, together with his report concerning the prevalence of tuberculosis on these islands, in which he states that the Bureau at Washington had no inspectors available at the present time for assignment to these islands, but that they will be glad to continue to assist the Board of Agriculture and Forestry in the way of supplying tuberculin, in any quantity, necessary for official tests. The President said he would make reply to same immediately.

LETTER TO HACKFELD AND COMPANY.

A letter to Messrs. H. Hackfeld & Co., approved by the members previous to the meeting, and signed by the President, was read by title. This bears the date of October 18, and pertains to the arrival on October 16 of the 57 horses on the steamship Hilonian.

President Campbell stated that no reply had as yet been received from Hackfeld & Co.

The meeting then adjourned.

Division of Entomology.

Honolulu, November 1, 1910.

Honorable Board of Commissioners of Agriculture and Forestry, Honolulu, T. H.

Gentlemen:—I respectfully submit my report of the work of the Division of Entomology for the month of October.

Of 29 vessels boarded we found fruits, plants and vegetables on 17, and a careful inspection of all articles was made with the following result:

<i>Disposal with principal causes:</i>	Lots	Parcels
Passed as free from pests.....	1,408	22,609
Fumigated before releasing.....	10	28
Burned	24	31
	<hr/>	<hr/>
Total inspected	1,442	22,668

PESTS INTERCEPTED.

In a lot of orchids arriving on the transport Sheridan from Manila we found a large number of pests; five species of beetles, some feeding in the decayed bulbs, caterpillars feeding on the foliage, three species of ants, several cockroaches (*Phyllodromia*), sowbugs (*Oniscus* sp.), two species of spiders and several centipedes. We also found some very large slugs (*Veronacella* sp.) with eggs and young, and a few snails (*Opeas* sp.). All the material was destroyed after first being fumigated, so as not to allow any crawling creatures to escape. We understand that these orchids were taken from the forest a few days before shipment and placed in the shipping box and this accounts for the large list of insects and other creatures found. Some plant shipments from the mainland were fumigated on account of some minor pests and as a precautionary measure.

There also arrived in the baggage of Japanese immigrants several lots of sand pears and apples, the latter containing holes showing the work of some fruit worm, but no larvae were found—the fruit being prohibited from landing, was promptly destroyed.

The season being at hand when stored potatoes develop the potato scab (*Oospora* scabies), I have sent notice to all importers of potatoes to warn their Coast agents not to ship any infested potatoes to the islands. I have also written to some dealers in San Francisco regarding scaly lemons, warning them of the return of such fruit when arriving here. I am pleased to state that on a whole all shipments have been

very clean and satisfactory, and I find that our dealers are very anxious to abide by the law, rules and regulations.

Much of my time was taken up with the investigation of the Mediterranean fruit fly, a report of which has already been submitted to the Board.

The Inspector at Hilo, Bro. M. Newell, reports the arrival of six steamers and one sailing vessel, of which four steamers brought fruit and vegetables consisting of 104 lots and 1688 parcels, which, being free from pests, were passed, except 25 bags of potatoes, which he ordered cleaned.

Further investigations of the disease which is killing off the Hitchcock or thimble berry in certain sections of Hawaii, show that it is doing good work against the berry. We have submitted the matter for determination to Dr. H. L. Lyon of the H. S. P. A. Experiment Station, and have furnished him a diseased plant. Dr. Lyon has been able to make cultures of the disease and thinks that the disease is a *Clypeosphaeria* sp. There is a record of some of these species attacking the *Rubus* species in the States, and it is not improbable that the disease has been brought in on some cultivated plant, raspberry or blackberry, and has spread to the thimble berry. We shall try and infest some healthy plants at the laboratory and we shall also endeavor to introduce the disease into some healthy patches away from the areas which now show the disease, with a view of ascertaining whether or not we can spread it artificially and aid in the rapid destruction of the plant pest.

Attached hereto I submit a brief report of the Assistant Entomologist for the month of October.

Very truly yours,

EDW. M. EHRHORN,
Superintendent of Entomology.

ASSISTANT ENTOMOLOGIST'S REPORT.

Honolulu, October 31, 1910.

Mr. E. M. Ehrhorn, Superintendent of Entomology, Honolulu, T. H.

Sir:—My investigations during the past month have been practically along the same lines as indicated in my earlier reports. I have continued to devote a large part of the time to work in the field with experiments and observations on various garden pests and in demonstration work. The field work has been supplemented, in the insectary, by breeding experiments.

I am making an especially careful study of insects which are injurious to cabbage. The results which I have ob-

tained both in the field and insectary have been very gratifying and plainly indicate that, if proper methods are followed, several of the most destructive pests of this crop may be readily controlled.

During this month I made two visits to Wahiawa for the purpose of getting additional notes on cabbage pests. Mr. A. W. Eames, of that place, is much interested in the work I have undertaken. At our suggestion he has purchased a good spraying outfit, and during the coming season, he will endeavor to carry out, on a comparatively large scale, the methods which my experiments on cabbage insects have indicated as being profitable.

I may state that I have commenced my demonstrations with the first start of the crop; namely, in the seed beds, and I have found that unless the seedlings are protected by a gauze covering or by repeated spraying there is apt to be a loss varying from 5 per cent. to 50 per cent., according to locality.

The experiments which I conducted in September, with the coöperation of Mr. F. G. Krauss, on *Aphis maidis* on broom corn, at the U. S. Experiment Station, proved impracticable, as was anticipated. However, some valuable data was obtained, and the time devoted to these experiments was by no means wasted.

Messrs. E. O. Hall & Son have received a supply of "Black Leaf 40," and it is now offered for sale in Honolulu. This material, when used in combination with whale-oil soap, has proved very effective as a spray against plant lice and some species of mealy-bugs.

Respectfully,

H. O. MARSH,
Assistant Entomologist.

60 YEARS'
EXPERIENCE

PATENTS

TRADE MARKS
DESIGNS
COPYRIGHTS &c.

Anyone sending a sketch and description may quickly ascertain our opinion free whether an invention is probably patentable. Communications strictly confidential. **HANDBOOK** on Patents sent free. Oldest agency for securing patents. Patents taken through Munn & Co. receive special notice, without charge, in the

Scientific American.

A handsomely illustrated weekly. Largest circulation of any scientific journal. Terms, \$3 a year; four months, \$1. Sold by all newsdealers.

MUNN & Co. 361 Broadway, New York
Branch Office, 625 F St., Washington, D. C.

Garden and Farm Tools and Implements

To do good farming you must have up to date tools to work with. We carry a most complete line of everything needed by the small or large farmer, from the smallest hand trowel to the largest cane plow. We also have a good assortment of Hand, Bucket or Barrel Sprayers. Our assortment of Hoes, Shovels, Spades, Mattocks, Rakes, Garden Shears, Lawn Mowers, Garden Hose, and other things that are needed daily about the farm or garden, is most complete and our stock large.

E. O. HALL & SON, LTD.

Board of Agriculture and Forestry.

PUBLICATIONS FOR DISTRIBUTION.

Any one or all of the publications listed below (except those marked *) will be sent to residents of this Territory, free, upon application to Mailing Clerk, P. O. Box 207, Honolulu.

BOARD.

- Report of the Commissioner of Agriculture and Forestry for 1900; 66 pp.
Report of the Commissioner of Agriculture and Forestry for 1902; 88 pp.
* First Report of the Board of Commissioners of Agriculture and Forestry, from July 1, 1903, to December 31, 1904; 170 pp.
Second Report of the Board of Commissioners of Agriculture and Forestry, for the year ending December 31, 1905; 240 pp.; 8 plates; 10 text figures.
Third Report of the Board of Commissioners of Agriculture and Forestry, for the year ending December 31, 1906; 212 pp.; 3 plates; 4 maps; 7 text figures.
Fourth Report of the Board of Commissioners of Agriculture and Forestry, for the calendar year ending December 31, 1907; 202 pp.; 7 plates.
Fifth Report of the Board of Commissioners of Agriculture and Forestry, for the calendar year ending December 31, 1908; 218 pp.; 34 plates.
"Notice to Importers," by H. E. Cooper; 4 pp.; 1903.
"Digest of the Statutes Relating to Importation, Soils, Plants, Fruits, Vegetables, etc., into the Territory of Hawaii." General Circular No. 1; 6 pp.
"Important Notice to Ship Owners, Fruit Importers and Other Rules and Regulations Prohibiting the Introduction of Certain Pests and Animals into the Territory of Hawaii." General Circular No. 2; 3 pp.; 1904.
"Law and Regulations, Importation and Inspection of Honey Bees and Honey." General Circular No. 3; 7 pp.; 1908.
"The Hawaiian Forester and Agriculturist," a monthly magazine. Vols. I to VI; 1904-1909. To be obtained from the Hawaiian Gazette Co., Honolulu. Price \$1 a year.

DIVISION ON ENTOMOLOGY.

- "The Leaf-Hopper of the Sugar Cane," by R. C. L. Perkins. Bulletin No. 1; 38 pp.; 1903.
** "A Catalogue of the Hemipterous Family Aleyrodidae," by G. W. Kirkaldy, and "Aleyrodidae of Hawaii and Fiji with Descriptions of New Species," by Jacob Kotinsky. Bulletin No. 2; 102 pp.; 1 plate; 1907.
* "On Some Diseases of Cane Specially Considered in Relation to the Leaf-Hopper Pest and to the Stripping of Cane," by R. C. L. Perkins. Press Bulletin No. 1; 4 pp.; 1904.
"A Circular of Information," by Jacob Kotinsky. Circular No. 1; 8 pp.; 1905.
"The Japanese Beetle Fungus," by Jacob Kotinsky and B. M. Newell. Circular No. 2; 4 pp., cut; 1905.
Report of the Division of Entomology, for the year ending December 31, 1905. Reprint from Second Report of the Board; 68 pp.; 3 plates; 10 text figures.
Report of the Division of Entomology, for the year ending December 31, 1906. Reprint from Third Report of the Board; 25 pp.; 7 text figures.
Report of the Division of Entomology, for the year ending December 31, 1907. Reprint from Fourth Report of the Board; 18 pp.; 1 plate.
Report of the Division of Entomology, for the year ending December 31, 1908. Reprint from Fifth Report of the Board; 26 pp.; 2 plates.

DIVISION OF FORESTRY.

- * "Forest and Ornamental Tree Seed for Sale at Government Nursery." Press Bulletin No. 1; 3 pp.; 1905.
* "Suggestions in regard to the Arbor Day Tree Planting Contest." Press Bulletin No. 2; 7 pp.; 1905.
"An Offer of Practical Assistance to Tree Planters." Circular No. 1; 6 pp.; 1905.
"Revised List of Forest and Ornamental Tree Seed for Sale at the Government Nursery." Press Bulletin No. 3; 4 pp.; 1906.
* "Instructions for Propagating and Planting Forest Trees." Press Bulletin No. 4; 4 pp.; 1906.
"Instructions for Planting Forest, Shade and Ornamental Trees." Press Bulletin No. 5; 7 pp.; 1909.
"Na Hoakaka no ke Kanu Ana i na Laau Malumalu ame na Laau Hoohiwahiwa." Press Bulletin No. 6; 8 pp.; 1909.
Report of the Division of Forestry, for the year ending December 31, 1905. Reprint from Second Report of the Board; 77 pp.; 5 plates.
* Report of the Division of Forestry, for the year ending December 31, 1906. Reprint from Third Report of the Board; 123 pp.; 4 maps.
Report of the Division of Forestry, for the year ending December 31, 1907. Reprint from Fourth Report of the Board; 70 pp.
Report of the Division of Forestry, for the year ending December 31, 1908. Reprint from Fifth Report of the Board; 85 pp.

** This Bulletin will be sent only to persons interested in the subject

* Out of print.

Board of Agriculture and Forestry.

PUBLICATIONS FOR DISTRIBUTION—Continued.

DIVISION OF ANIMAL INDUSTRY.

- * "Inspection of Imported Live Stock." Rule 1; 1 p.; 1905.
- * "Inspection and Testing of Imported Live Stock for Glanders and Tuberculosis." Rule 2; 1 p.; 1905.
- "Concerning Glandered Horse Stock in the Territory." Rule 3; 1 p.; 1905.
- * "To Amend Rule 1, Inspection of Imported Live Stock." Rule 4; 1 p.; 1907.
- "Rules and Regulations, Inspection and Testing of Live Stock." Rules and Laws; 11 pp.; Revised; 1910.
- "Quarantine of Horse Stock from California." Rule 8; 1 p.; 1908.
- Report of the Division of Animal Industry, for the year ending December 31, 1905. Reprint from Second Report of the Board; 62 pp.
- Report of the Division of Animal Industry, for the year ending December 31, 1906. Reprint from Third Report of the Board; 41 pp.; 3 plates.
- Report of the Division of Animal Industry, for the year ending December 31, 1907. Reprint from the Fourth Report of the Board; 104 pp.; 6 plates.
- Report of the Division of Animal Industry, for the year ending December 31, 1908. Reprint from Fifth Report of the Board; 44 pp.

DIVISION OF FORESTRY.

FOREST AND ORNAMENTAL TREE SEED AND SEEDLINGS FOR SALE AT THE GOVERNMENT NURSERY.

The Division of Forestry keeps constantly on hand at the Government Nursery, seed and seedlings of the important native and introduced trees. These are sold at prices just covering the cost of collection or growing.

The list includes both forest and ornamental trees, such as Silk Oak, Koa, various species of Eucalyptus, Golden and Pink Showers, Pride of India, Poinciana, Albizzia, etc. The price of the seed varies from 10 to 50 cents per ounce. The seedlings may be had for 2½ cents each, except a few kinds which are 5 cents. Seed of the various palms is also for sale; the price per 100 varying from \$1.00 to \$2.50. All seed is tested before being sent out, which insures its being good.

All communications in regard to seed or trees should be addressed to David Haughs, Forest Nurseryman, Box 207, Honolulu, Hawaii.

RALPH S. HOSMER,
Superintendent of Forestry.

DIVISION OF ENTOMOLOGY.

To give information about insects free of charge is one of the duties of this Division and Hawaiian readers are hereby invited to make inquiry in person and by mail. In order to be able to advise intelligently or send the right kind of useful insects for relief we like and sometimes it is indispensable for us to see the insect suspected or caught in the act, also specimens of the injury. In a tin with a hole or two, or a wooden box specimens may be mailed at 3rd class rates. When specimens are not accompanied by letter *always* write your name and address in the upper left-hand corner of the package. Address all communications SUPERINTENDENT DIVISION OF ENTOMOLOGY, P. O. BOX 07, HONOLULU, HAWAII.

EDW. M. EHRHORN,
Superintendent.



3 2044 103 120 028

